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SIXTEENTH SECTION.

Of the Cartilaginous System.[1]

§ 143.

Although the CARTILAGES in different parts of the body, especially as they have greater or less commixture of tendinous fibres, (fibro-cartilage,) exhibit very important differences of structure; they however all agree in this, that they exhibit vices of formation as rarely as morbid destruction, and that they possess also the consequent power to withstand, for a long while, those morbid influences which oftentimes completely destroy the neighbouring parts. As cartilage is formed very early in the embryon, so do we easily comprehend why its actual congenital DEFICIENCY is not otherwise observed than when the parts of which it forms the base, are entirely deficient or are very imperfectly developed;[2] in the latter case the cartilage is not properly formed, but is soft and like membrane, as in the young embryon.[3]

Just as rarely do we observe SUPERNUMERARY cartilages; to these belong certain little cartilaginous pieces, which we observe now and then in the external ear, the nose, the larynx, besides those which are usual; the fibro-cartilaginous mass sometimes formed in dislocations, as well as the thin cartilaginous plates which often show themselves in the new joints on the ends of broken bones; and lastly, the various extraneous isolated bodies which are composed of cartilage or fibro-cartilage, which we meet with as a congenital,[4] or more frequently as a morbid condition in various organs.[5]

The SIZE and FORM of cartilage rarely deviates, except when the whole organ, in which it is found, appears malformed; still we find now and then even one of the costal cartilages irregularly formed; the cartilaginous rings on the air tube vary uncommonly in their form, are crooked; the menisci in disease are diminished, rubbed through, &c. The latter also sometimes vary as to their natural POSITION, if from mechanical violence their CONNEXION with the neighbouring parts be disturbed.[6]

Not less permanent is their COLOUR, so that often they retain their whiteness and gloss in the midst of ulcerated and mortified parts; we however find them, as exceptions, in certain cases of greater destruction, opake, dull, and yellowish grey; also in the morbid deposition of lime, they lose their bluish, transparent colour; in the severer degrees of jaundice, they

have been in one instance seen yellow;[7] lastly, in diseases of young persons, although never red, still, on account of their somewhat increased vascularity, they appear at times pale-yellow.[8]

VICES OF CONTINUITY naturally do not often occur in cartilages, on account of their great elasticity; we observe, however, in the firmest of them, viz. the cartilages of the larynx and ribs, even in the cartilages of the ear, the nose, and the air-tube, especially if by morbid increase of the lime contained in them, their frangibility is increased, very often FRACTURES, which have been observed to unite in the costal cartilages only by a bony callus in form of scales or rings;[9] those however which are ever so small, as incised wounds of cartilages, unite indeed, but are merely joined by cellular tissue; loss of substance appears to be replaced no otherwise than by cellular tissue.[10]

(1) *Böttcher* Abhandlung von den Krankheiten der Knochen, Knorpel und Sehnen. 3 Theile. 8vo. Königsb. 1796. — *Autenrieth* resp. *Dörner* D. de gravioribus quibusdam cartilaginum mutationibus. 8vo. Tubing. 1798.—*Cruveilhier* Observations sur les cartilages diarthrodiaux et les maladies des articulations diarthrodiales; in Archives générales de Médecine, Vol. IV. p. 161.

(2) The fibrous cartilages in the joints are, however, in very rare instances, deficient. At least I once could not find, in a perfect syren monster, the semilunar cartilages in the knee-joint; once in a monster with imperfect formation of the face, the meniscus of the maxillary joint; and a few times in new-born children with club hands, the cartilago intermedia triangularis in the wrist-joint.—That single or several cartilages of the ribs are deficient, has been already observed above. v. § 136, note 14.

(3) For example, in the ears, the eye-lids, the nose, the air-tube, &c.

(4) Once in a new-born child, I found an irregular-shaped, angular, tolerably large piece of cartilage, situated beneath the skin of the neck, upon the sterno-mastoid muscle.—Another child had, in the inside of the upper eyelid, a tolerably large swelling, which consisted of firm cartilage, and was closely attached by a neck to the interior of the orbit.—In a sheep, I have found a few times, between the ear and the jaw, as a rudiment of a second mouth, a process principally composed of cartilage, with a canal leading inwards. v. No. 2322 and 2323.

(5) For instance, in the synovial cavities and the serous membranes, in the womb, the ovaries, in encysted tumours, &c.

(6) *Hesselbach* once found a triangular meniscus in the wrist-joint, torn from the ulna, and perforated in consequence of the friction at its base. v. Vollst. Anleitung zur Zergliederungskunde. Vol. I. Part II. p. 37, note. 4to. Arnstadt, 1806. — I once found in a strong man, after a severe strain, the external semilunar cartilage of the knee-joint situated in a cyst-like extension of the capsule, and torn through at its anterior extremity.

(7) *Stoll* Ratio Medendi.—*Störck's* Annus medicus, I. p. 150.

(8) This must not be confounded with the great redness exhibited in the cartilages of young people and animals, from maceration or soaking in water, which *Berzelius* states to arise from the oxide of iron contained in them.

(9) *Lobstein* Rapports sur les travaux exécutés à l'amphithéatre d'Anatomie. Strasb. 1805, p. 11.—*Magendie* and *Desöer* have also observed this. v. *Cruveilhier* Essai sur l'Anat. pathol. Part II. p. 9.—*Greve* saw it in the cartilages of three of the false ribs of a horse.

(10) On account of the small number of blood-vessels in cartilage, this is not to be wondered at. — In such injuries also, the membrane of the cartilage, from

which it especially seems to derive its support, is commonly destroyed, and thus the first step to regeneration is removed. If *Laennec*, in the Dict. des Scienc. Médic. Vol. IV. p. 129, consider the several thin spots of cartilage on the articular ends of bones to be newly produced cartilage, he is certainly mistaken; it is much rather the destruction of the cartilage.

§ 144.

Lastly, concerning VICES OF TEXTURE in cartilage, INFLAMMATION in this tissue is so indistinct, that it has been entirely denied.[1] We must not however exclude them from several vices of texture which are known as the usual consequences of inflammation, and occur also in cartilage; sometimes even slight traces of inflammation itself have been observed. To the latter belong, for instance, swelling of cartilage, inflammatory injection of the vessels in cartilaginous membranes, viz. of the larynx and costal cartilages, as well as in the interior of the cartilage, and particularly of fibro-cartilage, and the pale-reddish and even rosy-red colour which cartilage, and especially fibro-cartilage, sometimes exhibits; although compared with other organs, these signs of inflammation are always very indistinct and their course very tedious.[2] Inflammation of cartilage hardly ever runs into true ULCERATION with formation of pus; it only occurs when a previous conversion of the cartilage into bone has taken place. The usual consequence of inflammation is the SOFTENING AND DESTRUCTION OF THE CARTILAGE BY MORBID ABSORPTION; it is then found not merely porous and crumbling, but even converted into a greasy or jelly-like fluid, usually greyish, but sometimes also coloured;[3] or partially and generally withered, or finally more or less eroded; so that it is sometimes seen having many small pits and holes, sometimes lost in many single fibres, separated from each other and standing perpendicularly upon the articular ends of the bones. In such way is not unfrequently a meniscus, and the cartilaginous plate which overspreads a bone, entirely destroyed; in which case the ends of the bones, if anchylosis do not ensue, assume a thick and very rough bony covering, in consequence of the existing inflammation, which, in the motions of the joint, is gradually rubbed down, polished, and assumes a very similar appearance to ivory;[4] this is sometimes observed in gouty persons. More rarely, after destruction of the cartilaginous covering of the articular surfaces, is the bony matter deposited more largely and unequally, and thus a hilly surface is produced.[5]

As inflammation of cartilage is of so indistinct and chronic a nature, MORTIFICATION and NECROSIS are also very rare in this system; it has, however, been many times observed, that large or small pieces of cartilage, separated from the surface or lying in mortified soft parts, have exfoliated, that the cartilaginous

coverings of the articular ends of bones have been lost, indeed that even the whole of large cartilages, for instance, of the ribs and larynx, have been thrown off in malignant ulceration.

The last, and indeed not uncommon consequence of inflammation is OSSIFICATION, to which, however, all the cartilages have not a similar disposition; thus, for instance, in the cartilaginous tip of the breast-bone, the cartilages of the ribs and larynx, it is very common and extensive; more rarely, however, and imperfectly, the fibro-cartilages of the wind-pipe, the edgings of articular cavities, and the interarticular cartilages; still less in frequency and extent, those of the eyelids, ears, and nose; and the cartilaginous covering of the articular ends of bone, and the pulleys for tendons are perhaps never ossified. This ossification of the cartilaginous system, is distinctly preceded by an increased absorption of the jelly, and a greater vascular development, somewhat similar to the normal ossification of cartilage, so that the genuine cartilage then assumes a more fibrous appearance; and about the cornlike deposition of lime, little arterial nets are observed. In rare cases, especially in the cartilages of the ribs, the lime is deposited only in the membrane of the cartilage, whence these are merely surrounded by a kind of bony shell or rind. Cartilages morbidly converted into bone are equally subject to all the diseases which can affect normal bone.

(1) *Autenrieth* reviewed by *Dörner.* — *Russell,* A treatise on the Morbid affections of the Knee-joint. 8vo. Lond. 1802. — *Scott,* On diseases of the Joints. Lond. 1828.

(2) *H. Mayo,* in Lond. Medic. Chir. Trans. Vol. IX. Part I. speaks indeed of a transient inflammation and ulceration of the cartilages of the knee-joint, which commonly terminate in anchylosis of the joint. We, however, readily see that this is not properly expressed.

(3) We see this as a primary state, particularly common on the fibrous cartilage between the vertebræ, of which especially mention is made by *Palletta,* in his Exercit. pathol. Vol. I. p. 104—108; and by *Brodie,* in his Diseases of Joints.—I have also, several times, satisfied myself, that the destruction of the spine may originally spring from the intervertebral substance; but I have never found suppuration, except at the same time the bones and the neighbouring cellular tissue were inflamed. Sometimes in the intervertebral mass, and once also in the cartilage of a rib, more or less large roundish cavities, closed by membrane, which were filled with a brown reddish ichor, containing albumen.

(4) *Herzius* D. de crepitu ossium. Giessæ, 1704. — *Leidenfrost* in *Wesener* D. de susurru aurium. 4to. Duisb. 1785.—*v. Sömmerring's* Abhandlung über Gichtknochen in *Blumenbach's* Medic. Bibliothek. Vol. III. Part III. p. 493; and De morbis vasor. absorbent, p. 30. — *J. Wenzel* D. de ossium arthriticorum indole. 8vo. Mogunt. 1791. — *Cruveilhier;* and in Nouv. Biblioth. médicale. Jan. 1827, p. 79.—The latter observed this vice in the jaws, shoulder, and hip-joint; also in the horse.—I have found it not merely on the same spots, but also in the elbow-joint, between the radius and ulna, and especially in the knee-joint, of which proofs may be found in the Bresl. Mus.

(5) I have instances of this before me; whether it is of a similar nature with the gouty tophus to be subsequently treated of, I know not; however, in rare cases, it becomes so great as to give rise to dislocations.

SEVENTEENTH SECTION.

Of the Fibrous System in General, and of the Joints in Particular.[1]

§ 145.

The various membranous and ligamentous parts which we include in the fibrous system, exhibit numerous peculiarities, dependent on their position, connexion, and more minute variety of texture; in reference to the frequency and kind of their organic vices, however, they naturally agree with each other in many morbid phenomena, and especially in this, that, with the exception of the periosteum, perhaps, which is very vascular, and by its connexion with the bones more thereto disposed, these parts exhibit proportionally less disorganization, and this only after a long time and very indistinctly, on account of their lower vitality.

(1) *Rhases* Liber de morbis articulorum in Op. *Widmann* D. de genuum structura, eorumque morbis. Helmst. 1744.—*Curtmann* D. morborum articulationis ac symphysis brevis ætiologia ac diagnosis. Giessæ, 1797.—*Bacheracht* D. de morbis ligamentorum. L. B. 1750.—*Park*, On the Diseases of the Joints, etc. Lond. 1783.—*Götz* D. de morbis ligamentorum ex materiæ animalis mixtura et structura mutata cognoscendis. Halæ, 1798, with two engravings.—*J. Russel*, On the morbid affection of the Knee-joint. 8vo. Lond. 1802.—*B. N. Schreger* Chirurgische Versuche, Vol. II. No. 4. Nürnberg, 1818.—*Brodie* Pathological and surgical observations on diseases of the Joints. 8vo. Lond. 1818, with engravings. — *Wilson*, Lectures on the Structure and Physiol. of the parts comp. the Skeleton, and on the Diseases of the Bones and Joints. 8vo. Lond. 1820.—*Lloyd*, A treatise on the nature and treatment of Scrofula, describing its connexion with diseases of the Spine, Joints, &c. London, 1821. — *W. F. Gniest* D. de morbis articulorum. Halæ, 1826. — *F. A. G. Geiss* D. de morbis articulorum accuratius distinguendis et aptius curandis. 8vo. Halæ, 1826.

§ 146.

First, concerning the vices of NUMBER, SIZE, and FORM in this system; these are in general but seldom observed, and especially as congenital. Thus, for instance, the fibrous membranes investing the different viscera, the muscles, synovial membranes, &c. are only deficient when those parts are wanting; the ligament-fibrous parts are also very constant in their formation, although a fibrous band has been occasionally missed at a joint, or a whole ligament,[1] and particularly a tendon from a muscle. Sometimes indeed the capsules of joints, viz. those of the shoulder, the hip and knee, are so far imperfectly formed, that there are more or less large gaps in them, by which they are connected with the neighbouring mucous bags. Rarely also is INCREASED NUMBER of fibrous parts observed without duplicature of such organs

as they belong to, and then almost only in reference to tendons and individual bundles of fibres of joints; here, however, also belong the capsular ligaments constantly existing in irregular joints, which are sometimes formed after dislocations and fractures.[2]

The fibrous parts frequently vary in respect to their THICKNESS and SIZE; thus we find them, in some instances, congenitally, remarkably THIN, and as in the early state of fœtal existence, but little tendinous;[3] in other cases wasted and relaxed on account of disease, for instance, in lamed joints. Irregular THICKNESS is mostly a morbid state. Frequently also are certain parts of this system TOO SHORT or NARROW; to these belong the CONGENITAL STRICTURES which occur in the aponeuroses of the upper and lower extremities, to such extent, that the subjacent soft parts are retarded in their development; the relative narrowness, and consequent tension which arise in such aponeuroses, when pus, blood, &c. is effused in them, or the muscles are swollen by inflammation; the ligaments very short on one side in contortions of the limbs and spine, both congenital, and when acquired during youth,[4] and finally, the MORBID CONTRACTIONS, *contracturæ*, of certain fibrous parts, viz. tendons and ligaments, which mostly arise from inflammatory irritation after too great extension, cramp, &c. Just as frequently does the opposite vice, or IRREGULAR SIZE AND WIDTH, occur in such fibrous parts as surround other organs or cavities, and to as great extent, as they are capable of expanding in consequence of a power long operating on them; we find this not merely in swellings of the bones, of the spleen, the kidneys, &c. of which the fibrous membranes increase in equal proportion; but also the sclerotic coat of the eye, the dura-mater of the brain, the articular capsules, &c. are often very much expanded by collections of fluid, and then usually at the same time attenuated. Such expansion is frequently seen only at one spot, so that bag-like elongations are then formed.[5] The bundle-like articular ligaments nearest the articular capsules are also sometimes, in diminished tone, distinctly elongated, and give rise to dislocations.[6]

Mere vices of form very rarely occur in the fibrous system itself; to these belong, now and then, certain varying forms of isolated ligaments, unusual expansion in the articular ligaments, in the broad tendons of the abdominal muscles, in other tendons, and the like.

(1) This especially applies to the ligamentum teres at the hip-joint, which, in some cases as an original formation, but more frequently in consequence of rupture, suppuration and absorption, does not exist. Compare above, § 142, note 4, and *Tioch*, in Mém. de Montpellier, Vol. II. p. 354.—I myself have

twice missed it in syren monsters, and oftener in diseased hip-joints, especially those affected with gout; if the semilunar cartilage in the knee-joint, or the meniscus in the wrist be wanting, their ligaments also naturally do not exist. v. § 143, note 2.

(2) Compare § 109, note 5, and § 113, note 9.—*Howship* imagines that the formation of a new joint takes place only in those dislocations in which the capsular membrane, wherein the new bony matter is deposited, is not torn; this, however, is by no means the case, for after lacerations, tolerably perfect new joints are formed, as I have sometimes seen, and as the case described by *Warren* proves, in which the slit in the old capsule of the shoulder-joint remained, although at the same time there existed a new capsule with synovial membrane. It however requires a long time before the new capsule, which was at first cellular, becomes of a fibrous nature, which in false joints arising after fractures is very much furthered by motion, as *Villerme's* experiments on dogs have proved. v. Revue médicale, historique et philosophique. Paris, 1821, Vol. V. p. 68—75.—In a rabbit the new capsule was formed from the untorn but thickened periosteum of the thigh-bone. v. *Howship.*—An engraving of a false joint in the upper-arm is given by *Delpech* in his Chirurgie clinique de Montpellier, Vol. I.—Observations and engravings of similar joints in the thigh-bone and fore-arm are given by *Kuhnholtz* in the Journ. compl. du Dict des Scienc. med. Vol. III. p. 289.—An Indian at New-York was obliged to move himself forward by means of a large wooden ball, as he had double joints in both the upper and lower extremities. v. *Tilloch* Philos. Magaz. and Journ. No. 278, June, 1821.

(3) As it were, merely cellular, membranous-like.—I have seen this a few times in malformed eye-balls, and in the aponeuroses and articular ligaments of imperfect extremities.

(4) Very common in club-hands and feet, wry-neck, and other distortions, in which cases I have found it common in man, and often also in calves and lambs. Compare further the writers on club-feet.—*Murray* Fœtus hydrocephalo interno corrupti descriptio. Upsal, 1797.—*Rudolphi*, Swedische Annalen, Vol. I. p. 123, found it on a foot.—*Morgagni*, De sed. et caus. morbor. Epist. LXIII. p. 19, found in an old woman one lateral ligament of the dentiform process of the second vertebra much longer and thicker than the other.

(5) For instance, on the dura-mater in hernia cerebri and hydrencephalocele. —We sometimes find in horses, on the hock and pastern joints, tumours full of synovia, which originate in a partial extension of the articular capsule. v. *Rohlwes* Magaz. f. die Thierarzneikunde, Vol. I. Abhandlung von den Gallen.—[They are named by farriers, according to their situation, windgall, when about the fetlock; bogspavin, on the inside of the hock; thoroughpin, on the upper and back part of the hock; capulet, or capped-hock, on the point of the hock; and capped-elbow, on the point of the elbow. T.]—I have once noticed on the outside of the knee-joint in a man a bag-like expansion, in which, after a severe strain, probably, the external semilunar cartilage, partially torn through, was thrown.—Aneurysmal and varicose expansions of some parts of their fibrous membrane occur on the cellular bodies of the spine, &c.

(6) There are some persons whose ligaments are naturally so loose and long that they can bend some of their limbs in a contrary direction; thus, for instance, the finger and the thumb especially can be bent so much backwards as to touch the back of the hand. In a case of lameness and great atrophy of the left arm, I found the capsule of the shoulder joint very loose and long, so that the head of the upper-arm-bone hung very low and loose. v. Selt. Beob. II. p. 32, No. 11.—An interesting example of such looseness of several ligaments, giving rise to dislocations, is mentioned by *Götz*, p. 32.

§ 147.

The normal COLOURING of fibrous parts is rarely entirely, although in different vices of texture variously changed; this occurs also sometimes without any other distinct morbid

change, and indeed from the deposit of animal pigment; to these belong, that in jaundice, as well as the colour but seldom occurring, and more or less yellow, and still more seldom brown or blackish, in melanosis.[1] In the negro fowls, all the fibrous membranes and ligaments are hereditarily of a blackish colour.[2]

(1) I once found several single black spots on the fibrous membrane of the air-tube; also a few times brownish or blackish spots upon the dura-mater, without distinct vice of texture.

(2) *Chapotin* Topographie medicale de l'Isle de France, p. 31.—*Pallas* Zoographia Rosso-Asiatica. Vol. II. p. 90. 4to. Petrop. 1811.—*Temminck* Histoire naturelle des Pigeons et des Gallinaces. 8vo. Vol. II. p. 253 and 256. Amsterd. 1813.—*Rudolphi* Grundriss der Physiologie, Vol. I. § 77, note 1.

§ 148.

VICES OF CONTINUITY in this system are sometimes produced by preceding atrophy or marcor, and by extension gradually increased to bursting, but more frequently by sudden and actual violence. To the latter belong, various wounds with and without loss of substance, the perfect and imperfect rupture of tendons[1] and tendinous sheaths, which originate not unfrequently in violent muscular exertion, and the rupture of ligaments arising mostly from external violence, which occurs as a usual condition in dislocations from external causes;[2] whilst in dislocations from internal causes, as arthrocacy, collections of water and pus in joints, swelling of the ligaments, cartilage, and the fatty masses in joints, exostosis,[3] &c. the ligaments are only more or less expanded; although the latter occur as an exception also in dislocation from external causes, especially in imperfect dislocation without any rupture.

Although simple incised wounds of fibrous organs seem to heal easily and quickly, this, however, is by no means the case with other of their injuries, especially in those with loss of substance, as almost all fibrous parts possess but very confined or even no reproductive power; and commonly wounds and loss of substance in them are only healed and replaced by cellular tissue, which gradually becomes tougher, but seldom actually tendinous. Hence, for instance, ruptured ligaments heal but slowly and imperfectly, so that consequently the reproduced synovial membrane and the new cellular tissue are ruptured by less violence, and the head of the bone is again protruded through the old aperture.[4] The difficulty of reproduction is not, however, equally great in all parts of the fibrous system, as when tendons have been destroyed by suppuration or mechanical violence, they sometimes appear to be not only actually reproduced,[5] but even the periosteum itself is also easily and quickly restored.

(1) Compare *Reuss* Repertor. Comment. Vol. X. p. 63, de ruptura tendinum.—*de Plouquet* Repertor. Art. Tendo.—Very frequently the tendo Achillis. v. *Kulmus* D. de tendine Achillis disrupto, etc. Gendan. 1760.—*Delauriere* D. sur la solution de continuité du tendon d'Achille, produite par la contraction musculaire. Paris, 1809.—*Oehlers* D. tendinis Achillis disrupti felicissimæ sanationis, etc. 8vo. Kiliæ, 1819.—A case of imperfect rupture of the tendo Achillis is given by *Ehrmann* Compte rendu des travaux anatomiques. Strasb. 1827, p. 22. *Kelch*, Beiträge zur pathol. Anatom. No. 16, found, in a very old dislocation of the upper-arm-bone, the long tendon of the M. biceps torn; an instance of rupture of the ligament of the patella is given in the Lond. Med. Repos. Sept. 1825.—Ruptures of tendons also occur in animals, viz. the perforating flexor tendon of the foot in a horse. v. *Greve* Erfahr. und Beob. über die Krankheiten der Hausthiere, Vol. II. p. 5.—*C. Fr. Hoffendahl* D. de tendinis Achillis ruptura et conglutinatione. 4to. Berol. 1826, with plates.

(2) Compare the observations above quoted, § 109, note 3 and 4; also *A. Bonn*, Comment. de humero luxato. 4to. L. B. and Amstel. 1782, with engravings.—*Todd's* account of a recent dislocation of the hip-joint, in Dublin Hosp. Rep. and Commun. in Med. and Surg. Vol. III. Dublin, 1822.—*Warren.*— Sometimes merely one lateral, or only an internal ligament, as the round ligament of the hip is torn, whilst the capsule of the joint remains uninjured; the latter was observed by *Hesselbach*, Vollst. Anleitung zur Zergliederungskunde, Vol. I. Part II. p. 57.—*W. Wallace* in Dublin Transactions of the Association of Physicians, Vol. V. 1826.

(3) *Spangenberg* relates an instance in the translation of *Boyer's* work on the diseases of bones. Vol. II. p. 197. Leipz. 1804.—*Nees* observed a spontaneous dislocation from the deposition of gouty tophus in a joint. v. *Hufeland's* Journ. der prakt. Heilk. Vol. XVI. Part II. p. 180.

(4) I have seen dislocations several months and even years old, in which the original rupture of the articular capsule was still very distinct, and merely closed within by synovial membrane, and without by a little and soft cellular tissue. In a lady of my acquaintance, who some twenty years since dislocated the humerus, the bone was readily dislocated at every violent elevation, but was as easily reduced. Hence also old dislocations are sometimes perfectly replaced; for instance, the head of the thigh-bone, even after five years. v. *Cornish* in Lond. Med. Repos. p. 200. March, 1822.

(5) A most remarkable instance of this is related by *Baronio*, in which the whole tendo Achillis was reproduced. v. *Weigel's* Italien. medic. chir. Bibliothek. Vol. IV. Part I. p. 47.—Experiments on the reproduction of this tendon are related by *Lee Fearn* in Medical Recorder, quarterly series, No. 39, Vol. XII. No. 1.

§ 149.

INFLAMMATION,[1] as the common cause of VICE OF TEXTURE in fibrous parts, deserves first to be noticed. This is in general not very frequent; but in parts of this system which are very vascular, as the periosteum, the articular ligaments, and the dura-mater, it is by no means unfrequent, and is sometimes produced by mechanical causes, as contusions, ruptures,[2] wounds, occasionally by stabs, &c., sometimes by general diseases communicated to them, and among these especially, gout, rheumatism, syphilis, and scrofula. The inflammation of fibrous parts rarely assumes an acute character, as is, however, sometimes the case in gout and rheumatism; its course is usually more tedious, and all the phenomena so indistinct, that they are often overlooked. According as the degree of

the inflammation and the state of the fibrous parts varies, so do we find the REDNESS and SWELLING in a greater or less degree; sometimes indeed we observe the parts, as it were, merely injected, or with more or less large and numerous red streaks or undefined spots; in other cases they are more generally reddened, and not uncommonly of a rose-red colour; the latter is especially the case, if they come in contact with the air, as may be best seen in trepanning and in amputation through joints; in many cases also the colour of the inflamed parts is more or less yellowish, and if they have naturally a tendinous glistening, that is also in general completely lost, and in chronic or often repeated inflammation and their consequences, the fibrous organs are sometimes also found discoloured in various ways, viz. grey, brownish, and even blackish.

The SWELLING is commonly but trifling; if the inflammation continue longer, or it recur often without complete resolution, the fibrous organs also swell very much, and we then find the fibrous structure more or less wasted, their boundaries with the neighbouring as well as with the inflammatory parts, not distinct, and either a jelly-like fluid poured out into the swollen cellular tissue, or the latter converted rather into a soft, reddish kind of substance.

Should the degree of inflammation be very high, it runs, although tediously and moderately, into SUPPURATION, in which the fibrous parts are eaten through, and more or less destroyed.

(1) *Huhn* D. de rite cognoscenda et curanda systematis fibrosi inflammatione. 8vo. Halæ, 1820. — *Rayer*, in Archives générales de Médecine, March and April, 1823.

(2) For example, in sprains and dislocations of joints, distortio.

§ 150.

Concerning the INFLAMED STATE OF JOINTS in particular, this indeed in many cases has its original seat in their fibrous and fibro-cartilaginous parts,[1] however more frequently in their lining membrane, the SYNOVIAL,[2] which like all serous membranes easily inflames; it is just as easily affected by mechanical causes as by gout, rheumatism, syphilis, metastasis, &c., and is then found more or less swollen, reddened, and softened.[3] If the inflammation be not resolved, then there is consequent either increased secretion into the joint especially of fibrous matter, which not rarely produces anchylosis, or there is more usually suppuration. Not less frequently does articular inflammation and destruction originate in the bones, of which the articular extremities, partly from injuries, partly

in an especial manner from scrofulous diseases, and other internal causes, inflame; and internal caries, *caries articulorum interna seu centralis*,[4] a kind of pædarthrocacy, is produced. But should the disease have its original seat in the bones or synovial membrane, sometimes also are the fibrous, fibro-cartilaginous, and even the bony parts of the joint themselves co-affected; this is also the case where the morbid causes operate so violently upon the joint, that all the parts are simultaneously attacked with inflammation, as we not unfrequently find the case after violent bruises, penetrating wounds, fractures of bones, which extend into joints, &c. In all these cases there arises either an ACUTE and distinctly progressive general INFLAMMATION OF THE JOINT, *arthrophlegmone*, to which articular anchylosis, abscess, caries, *caries externa*,[5] &c. are consequent; or a more chronic, and in its origin a more undecided state of inflammation, mostly produced by scrofula and rheumatism, which, according to the variety of its symptoms, seat and consequences, is named *morbus coxarius*, *luxatio spontanea*, *claudicatio congenita*, *fungus articulorum*, *arthrocace*, HIP DISEASE, SPONTANEOUS LAMENESS, ARTICULAR FUNGUS;[6] but it is essentially always the same disease, of which the following are the most remarkable symptoms: the joint is, more or less, sometimes very remarkably swollen, less movable than in the healthy state, and always to a certain degree bent; the tumour itself is at certain parts hard, firm, elastic, in other parts as it were doughy, and unsteady; the common integuments, even to the last stage, when sinuses are formed, remain unchanged, though occasionally somewhat varicose and underlaid with hard fat; the muscles which surround the joint often appear pale, and together with the neighbouring cellular tissue, infiltrated with lymph; the articular ligaments more or less swollen, hardened, although loosened in some spots, dull, often without any distinct fibres, and often consolidated with the neighbouring cellular tissue; whitish, here and there discoloured, generally converted into an unvascular mass, in which are observed at different parts several little cavities filled with lymph, jelly-like fluid, or ichorous pus; the internal articular ligaments, the menisci, the cartilaginous layers on the articular extremities, and the synovial membrane are entirely or partially destroyed; the bone becomes affected primarily or secondarily in a greater or less degree, is either swollen, softened, inflamed, and becoming carious from within, or it is but little swollen and tolerably hard, but superficially eroded or destroyed by caries, by which in general, especially if the heads of the joint are swollen, and even without that, dislo-

aux tumeurs blanches des articulations. 8vo. Paris, 1802.—*Berends* D. de fungo articulor. Francof. 1804.—*Franck* D. de morbo coxario. Marburg. 1804.—*Veerbek* De morbo coxario seu de tumore albo articuli coxo-femoralis. 4to. Paris, 1806.—*J. A. Albers* and *Ficker* Gekrönte Preisschrift über das sogenannte freiwillige Hinken der Kinder. 4to. Wien, 1807.—*Crowther*, Practical observations on the disease of the joints, commonly called White Swelling, &c. London, 1808.—*Wirth* D. de coxalgia. Wirceb. 1809.—*Krause* De claudicatione Comm. med. chir. 4to. Lips. 1809.—*Pundt* D. de fungo articuli. Gött. 1809.—*J. Watts* D. de morbo coxario. Edinb. 1809.—*Browne* D. de morbo coxario. Edinb. 1813.—*Gordon* D. de tumore albido. Edinb. 1815.—*Baier* D. de fungo articulor. 8vo. Wirceburg. 1816.—*Volpi* Saggio di osservazioni medico-chirurgiche, Vol. III. No. 4. Pavia, 1816.—*R. M. Davis* D. de morbo coxario. Edinb. 1816.—*Rust* Arthrokakologie, oder über die Verrenkung durch innere Bedingung und über die Anwendung des Glüheisens. 4to. Wien, 1817, with eight engravings.—*P. Fairbairn* D. de mordo coxario. Edinb. 1819.—*Leube* Adnotationes ad coxarthrocacen. 8vo. Tubing. 1821.—*C. L. Lehmann* D. de coxarthrocace. 8vo. Berol. 1821.—*Jungnickel* D. de tumore albo. 8vo. Berol. 1824.—*Reisick* Abhandlung über die Coxalgie. 8vo. Prag. 1824.—*Margot* Mém. sur les tumeurs blanches des articulations, in Archives génerales de Médecine, May, 1826.—*Lehmann* Tumoris genu albi et Gonarthrocaces adumbratio pathologica. 8vo. Rostock. 1826.—*Ruhstrat* Abhandlung über die weisse Kniegeschwulst. 8vo. Gött. 1826.—*H. F. Zöhrer* Monographie der weissen Geschwulstam Kniegelenke, u. s. w. Wien, 1828.—*Sprengel* in *Rust's* Magaz. f. d. ges. Heilk. Vol. IX. Part II. p. 302, has well described a few cases of White Swelling in the knee; and *Nicolai* also in the same work, Vol. XXII. Part I. p. 3.—Compare above, § 135, 138, and 142.—In very rare instances, congenital spontaneous disease of the hip-joint has been observed. v. *Hippocrates* De articulis, Sect. VI. p. 819.—*Albers* relates three instances of it; perhaps also the cases of congenital dislocation of the head of the thigh-bone mentioned by *Dupuytren* may be referred here, at least that in which the round ligament was very much elongated. v. Repertorie général d'Anatomie et de Physiologie pathologiques, etc. Vol. II. Part III. p. 150.

(7) I have made use of this description, after numerous observations on individual cases, and the proofs of it are partly to be found in Bresl. Mus. v. No. 2152—2154, 3407, 3408, 3432—3435, 3440, 3442, 3443, 3489, 3684—3693, &c.

(8) I have found examples in the hip-joint in two monkeys, one *nasua rufa*, and one adult female kangaroo. Perhaps also here belongs the diseased hip-joint of a pig, mentioned by *Sandifort* Mus. Anat. III. p. 241, No. 681, 682.

§ 151.

Another termination of inflammation in the fibrous system is OSSIFICATION,[1] which is especially very common in many parts of this system, viz. the ligaments and the dura-mater; less frequently in the periosteum,[2] the tendons,[3] the fibrous membrane of the spleen, and but seldom in the other fibrous structures; it shows also a very different degree of production, as sometimes only the fibro-cartilaginous base of bone is deposited in form of plates or flat roundish swellings,[4] more frequently true phosphate of lime is deposited, sometimes as distinct spots and kernels of bone surrounded with vascular circlets, sometimes in form of splinters, sometimes, lastly, throughout and equally in the fibrous tissue. Should the articular ligaments, which are then usually shortened, be found in this state, there ensues either STIFFNESS OF THE JOINT, *rigiditas articulorum*,

anchylosis incompleta seu spuria, or ACTUAL ANCHYLOSIS, *anchylosis vera*.[5] Both vices occur commonly in man and even in animals, when an earthy mass, less resembling bone than gypsum or chalk, GOUTY TOPHUS,[6] as it is called, consisting especially of urate of soda, is, in gouty persons, deposited in the ligaments, in the neighbouring aponeuroses, and periosteum of one or several joints, at first in a soft, but subsequently in a hard state, and often in great quantity.

(1) Compare especially *Boyer* in Archiv. génér. de Médec. March and April, 1823.

(2) v. above, § 119.

(3) I have seen only a few instances in man.—A good example on almost all the tendons of the lower extremities is described by *Veslingius* Observ. Anat. Epist. posth. XV.—Other instances in *Bartholinus* De diaphragmatis structura nov. Paris, 1676.—*Booerhaave* Prælect. ad instit. Medic. edit. *Halleri*. Goett. 1739, § 478.—*Heuermann* Physiologie, Vol. III. p. 162.—Whether the disease described by *Sauvages* in his Nosol. Method. Vol. I. p. 530, under the name *Catochus*, and by *Macbride* in his Introd. med. theor. et pract. med. Traj. 1774, as *sarcostosis*, in which the entire limb was said to be converted into bone, belongs here, or whether it was ossification of the aponeurosis, it is very difficult to determine, as they, and indeed that related by *Henry*, in Philos. Trans. 1759, Vol. LI. p. 89; Vol. LII. Part I. p. 143, are very doubtful.—*Walter* also found lime deposited between the tendons of the fore-arm, in a gouty person. v. his Mus. Anat. Vol. I. p. 144, No. 289.– In animals, ossification of the tendons is more frequently observed; for instance, in the horse. v. *Schwab* Materialen zur pathol. Anat. der Hausthiere, 1ste Liefer, p. 49.– In the Cape jerboa, and other quadrupeds, which always spring from their hind limbs. v. *Cuvier* Leçons d'Anat. Comp. Vol. I. p. 115.—I found the tendo Achillis ossified in a dipus; very frequently in birds, especially of the gallinaceous kind, in the legs; and, before all others, in cranes. v. *Rudolphi* Physiol. Vol. I. p. 85, § 88, note.—I have observed the same in the peacock, guinea-fowl, partridge, crax pauxi, No. 3931 of Bresl. Mus. and in an ossifrage eagle.

(4) Here partly belong the gummata in the periosteum, the fibro-cartilaginous spots on capsular membranes especially in the hip-joint, the frequent cartilaginous plates in the fibrous membrane of the spleen, in the tendons of the smaller muscles, &c.

(5) Compare above, § 109.—Also without anchylosis, those ligaments which connect two immovable bones naturally become ossified; for instance, the proper ligaments of the blade-bone, the lig. tuberoso and spinoso-sacrum, &c.—*Greve* saw a large lime-like deposit in the nuchal ligament of a horse. v. his Erfahr. und Beob. über die Krankheiten der Hausthiere, Vol. II. p. 4.

(6) Gouty deposits occur not merely on the joints of the extremities, but even in the jaw. v. No. 3270, 3271, and 8360, of Bresl. Mus.—On the joints of the spine, &c.—Sometimes they become very large; I have seen them as large and larger than a walnut. In many instances they give rise to spontaneous dislocation.—v. *Lieutaud* Historia anat. medica. Vol. III. p. 90, Obs. 230 and 232.—*Nees* in *Hufeland's* Journ. der prakt. Heilk. Vol. XVI. Part II. p. 180.—On gouty deposits, compare § 72, note 3.—Also *Contuli* De lapidibus podagræ et chiragræ in corp. hum. productis. Rom, 1679. — *Born* De arthritide nodosa. Leid. 1699.—*van Priesteren* D. calculorum genesis et convenientia cum tophis podagricis. L. B. 1788.—*Jäger* D. acidum phosphoricum morbor. quorundam caussam proponens. Stuttgart, 1793.—A remarkable instance of tophus in the ligaments, tendons, and aponeurosis about a joint, is described by *Lobstein* in Compte rendu sur les travaux anatomiques, etc. Strasb. 1824, p. 16.—Another by *van der Boon Mesch* Eene scheidkundige outleding van den Jichtkalk in Bydragen tot de naturkundige Wetenschappen. Amsterd. 1826, D. I. No. 2, p. 127.—*Tennant's* and *Wollaston's* opinion that it is not phosphate of lime, but phosphate

of soda, is confirmed by *Fourcroy* and *Vauquelin* in Anal. du Mus. d'hist. nat. Vol. I. p. 93; Vol. II. p. 201; Vol. IV. p. 329, and in *Fourcroy's* Syst. de conn. chym. Vol. X. p. 265.—*Vogel* in Bulletin de Pharm. No. 12, p. 568, &c.—In many instances gouty concretions contain no urate of soda, but phosphate of lime.—*John* in *Meckel's* Archiv für die Physiol. Vol. I. Part IV. p. 513. —Gouty tophus also occurs in animals, though much more rarely; viz. in fowls and hawks, on the joints of the toes. v. *Aldrovandi* Ornithol. Vol. I. p. 456.—*Tiedemann* Zoologie, Vol. II. p. 165.

§ 152.

A very rare termination of the inflammation of fibrous parts is MORTIFICATION;[1] it occurs primarily and distinctly, but is always rare, perhaps only in such parts of the system as are proportionally tolerably supplied with blood-vessels, viz. the periosteum and the dura-mater; in the other fibrous organs, for instance, the tendons, articular ligaments, aponeuroses, &c., it has generally only been primarily observed, when they have been completely laid bare by wounds and ulcers, and exposed to the air, in which case they are destroyed and exfoliate, together with the surface of the bones and cartilages.[2] In connexion with other parts, the fibrous system, as is understood, is often attacked with mortification; so that, for instance, in a mortified foot, the tendons, aponeuroses, &c. together with the other soft parts, become gangrenous; anthrax also easily extends itself from the neighbouring to fibrous parts.[3] In mortified limbs, the articular ligaments are also attacked, so that hence sometimes arises the spontaneous loss of a limb.[4]

(1) Neither brownish nor blackish coloured fibrous parts are, for that reason, gangrenous; because sometimes from morbid irritation alone there is a deposit of black pigment. Compare § 147.

(2) Remarkable instances of exfoliation of the tendo Achillis are described by *Baronio*, and by *Acrel*, v. Chirurg. Vorfälle, Vol. II. p. 380. This is not unfrequently the case in the finger in whitloe.—[In the Mus. at St. Thomas's Hospital, there is a tendon on one of the flexors, which had sloughed out, in consequence of injury to the finger. T.]

(3) *Lavernet* in Journ. de Médec. contin. Vol. II. p. 248, describes a case of destruction of several tendons by an anthrax.

(4) Compare § 62.

§ 153.

As to SPURIOUS FORMATIONS, these are but rarely observed in the fibrous system. There exist, for instance, but few examples of ENCYSTED TUMOURS[1] in this tissue, if we do not reckon those bursal tumours which occur on the articular capsules, and partly between the tendinous fibres of the aponeuroses, and especially on the elbow-joint, and knee-cap, which have their origin in the mucous bags there placed. Just as rare are the TUBERCULAR FORMATIONS in and on fibrous parts; deposits of scrofulous matter, however, occur here and there in the

To the extraneous substances which we sometimes observe in joints, belongs QUICKSILVER,[4] which is however very rare; rarely also BLOOD, which is effused into joints in injuries of various kinds;[5] more frequently PUS, which is produced either from a high inflammatory state of the synovial membrane, and of the bony cartilages and ligaments forming the joint in the articular cavity itself, or it may have made its way into the joint from without;[6] and lastly, UNUSUAL LOOSE CARTILAGINOUS CONCRETIONS, which have not unfrequently been observed to grow on the inner or expanded surface of the synovial membrane, into CLUB-LIKE OR NECKED APPENDAGES;[7] these at first are attached by thin threads, but when these are broken, they lie loosely in the joint, are at first soft, then mostly cartilaginous, sometimes however merely cartilaginous within, or are entirely bony; are usually round, but in some cases also flattened and angular, and very variable in size and number.[8]

(1) Very commonly in acute rheumatism.

(2) *J. A. Cämmerer* præs. *Haase* D. de unguine articulari ejusque vitiis. 4to. Lips. 1774.

(3) *Fabricius Hildanus* De ichore et meliceria acri Celsi, sive Hydarthro, v. Op. p. 831. — *M. Hoffmann* D. de meliceria s. articulorum læsorum inundatione. Altd. 1650. — *Charisius* D. de meliceria Celsi. Regiom. 1726. — *Haffner* Von der Gelenkwassersucht. Freiburg. v. *Weiz* N. Auszüge. Vol. V. p. 129. — *Brown* D. de hydarthro. Edinb. 1798. — *Savarin-Marestan* D. sur les hydropisies articulaires, etc. 8vo. Paris, 1803. — *Sanders* D. de hydarthro. Edinb. 1809. — *Taaks* D. de hydrope articulationum. 8vo. Berlin, 1815. — *Russel*, Chap. VI. — An instance of water in the knee-joint is described by *Bobillier* in Recueil de Mémoires de Méd. Chir. et Pharm. militaire par *Fournier*, Vol. XI. p. 300. — In a rickety boy, four years old, I once saw dropsy of the joints, both of the foot and hand, as also of the membrana capsularis carpi communis. — In the horse, hydrarthus is not rare. v. *Rohlwes* Magaz. f. d. Thier arz neikunde, Vol. I. — Of windgalls, v. *Greve* Erfahr und Beob. über die Krankheiten der Hausthiere, Vol. I. p. 85.

(4) Several instances in *Lieutaud* Historia anatomico medica, Vol. III. p. 93.

(5) Compare *Russel*, Chap. V. — *Hey*, Practical Observations in Surgery, p. 354.

(6) Abscesses in the neighbouring soft parts easily penetrate into the cavities of the hip and knee, when the mucous bags there situated are connected by an aperture with the joint, either from being rubbed through, or as an original vice of formation. I have seen some such instances in both the above-mentioned joints. In one case, v. my Selt. Beob. Part II. No. 17, p. 42, a lumbar abscess had burst into the hip-joint. I have also since seen another such case. *Rust*, too, describes a similar instance, in his Magaz. f. d. ges. Heilkunde. Vol. I. Part I. p. 46.

(7) Compare above, § 81. — Cases in which these processes with necks were very numerous are described by *A. Bonn*, in Thesauro ossium morbosor. Hoviano, No. 75; and by *Götz* D. de morbis ligamentorum, tab. 1. — *Bobillier* in Recueil de Méd. Chir. et Pharm. milit. par *Fournier*, Vol. XI. p. 300; all three in the knee-joint. I have lately observed a very great quantity of them in the diseased hip-joint of a gouty person; we usually find at the same time much viscous synovia in the joint.

(8) The disease is also called mures in genu; by *Swediaur*, arthroncus tuberculosus. Such cartilages are not to be confounded with little exostoses and

(v. *Home*), and a diseased knee-joint, which was internally covered with cartilaginous growths, and with several large cartilages suspended by necks. Further, in the Anat. Mus. of the Surgical Academy at Copenhagen, a few large cartilages, removed from the knee-joint by operation; and a large irregular cartilaginous concretion from the knee, in the Anat. Mus. at Rostock. I have described three such instances in my Selt. Beob. Part II. p. 37, No. 14, the first of which consists of a large loose flat bone from the knee; the second, of a little cartilage from the elbow; and the third, of two bones hanging by threads to the knee. I have since twice found in the elbow-joint a little loose cartilage. v. my Verzeichn. No. 2159, 2161—2163, and 8446, of the Bresl. Mus.

EIGHTEENTH SECTION.

Of the Muscular System.

§ 155.

Among the different vices of the muscular system[1] are its so-called VARIETIES,[2] and especially such as refer to NUMBER, which are the most common; rarely, however, is there a true morbid condition, that is, the cause of impeded or disturbed muscular activity. The latter, however, is the case, if in monsters the muscles of the whole body, or of certain regions, have not been developed from their original jelly-like cellular base into true muscles, or are entirely deficient; this has been observed in some instances throughout the whole body;[3] more frequently at certain parts.[4] The congenital deficiency of certain muscles, or parts of them, without actual hindrance of the power of motion, is very common; thus the *zygomaticus minor*, one *sternothyreoideus*, *stylohyoideus*, *styloglossus*, one *scalenus*, the *sternocostalis*, one or both *pyramidales abdominis*, the *interspinales cervicis*, the *palmaris longus*, one *lumbricalis*, the *extensor proprius*, and the *flexor* of the little finger, one or other tendon of the *flexor* and *extensor* of the fingers, the *psoas minor*, the upper *gemellus*, the *plantaris*, the *peroneus tertius*, and single heads of the *flexor* and *extensor* of the toes are deficient.[5] More rarely is there deficiency of all or some of the muscles of the eyes,[6] of the *levator labii superioris proprius*, the *zygomaticus major*, the *geniohyoideus*, both *stylopharyngei*, the *omohyoideus*, the long head of the *biceps brachii*,[7] the whole anterior half of the *deltoideus*,[8] the *pronator quadratus*, the middle portion of the *serratus anticus major*, of the lower *gemellus*, the *pyriformis*,[9] the *quadratus femoris*, the short head of the *biceps femoris*, &c.

The opposite vice, or EXCESS OF NUMBER in the muscles, is not less frequent, and occurs sometimes in many parts of the

body at once.[10] The increased number commonly arises from the stronger development and division of the normal muscles; thus, for instance, we observe the *obliquus oculi superior*, and the *abducens*,[11] the *retrahentes auris*, the *risorius santorini*, *depressor alæ narium*, *stylohyoideus*, *stylopharyngeus*, *geniohyoideus*, *omohyoideus*, *sternohyoideus*, the *sternocleidomastoideus*, *splenius capitis*, *rectus capitis posticus major*, *rectus capitis lateralis*, the *scaleni*, *interspinales*, *intercostales*, *cucullares*, *pectorales*, the *subclavius*, *biceps brachii*, *brachialis internus*, *pronator teres* and *quadratus*, *supinator brevis*, *extensor radialis brevis*, the *flexores* and *extensores* of the fingers, the *lumbricales*, the *pyramidales* and *recti abdominis*, the *glutæi*, the *pyramidalis*, the *adductores femoris*, the *sartorius*, *biceps femoris*, *popliteus*, *peroneus brevis*, the *extensores* and *flexores* of the toes, &c. double or even manifold. The normal number is also increased, although much more rarely, by entirely unusual muscles; to these belong, viz. the *anomalus faciei*, *cephalopharyngeus*, a muscle between the *occipital* bone and the transverse process of the second cervical vertebra, another between the transverse process of the sixth, and the collar-bone, a *capsularis humeri*, the *sternalis brutorum*, the *extensores breves* of the fingers, a very remarkable muscle on the under and outer part of the hinder surface of the tibia, &c. In many instances normally formed muscles send off unusual heads or tendons, for example, the *omohyoideus*, a head to the *sternothyreoideus;* the *digastrici maxillæ*, a head which connects them with each other and binds them to the *transversus menti;* the *sternocleidomastoideus*, a slip to the angle of the lower jaw; a long process from the *levator anguli scapulæ*, which loses itself between the shoulder-blade and the spine; from the *serratus posticus superior*, a portion to the transverse process of the first vertebra; from the *pectoralis major*, a fleshy or tendinous portion to the *latissimus dorsi*, which can easily compress the axillary vessels and nerves, or processes to the skin of the arm-pit, to the tendon of the *coraco brachialis*, to the *biceps brachii*, &c.; a slip to the *latissimus dorsi*, to the *processus coracoideus*, or to the occipital bone; a slip of the *deltoideus*, to the *infraspinatus*, or inner edge of the shoulder-blade; the *ulnaris externus*, a tendon to the fifth finger, the *flexor digitorum communis profundus*, a head to the *condylus flexorius;* the *biceps femoris*, a slip to the tendo Achillis, &c.

(1) *Isenflamm* D. de musculorum pathologia. 4to. Erlang. 1774.—*de Schallhammer* D. de morbis fibræ muscularis ex materiei animalis mixtura mutata cognoscendis. 4to. Halæ, 1799, with engravings; and in *Reil's* Archiv f. d.

Physiol. Vol. IV. p. 222. — *Rodati* in præparationes myo-pathologicas Musei Bononiensis animadversiones in Opusc. scientific. Fasc. XVIII. p. 397.

(2) *G. de la Faye* Observat. anat. sur des muscles surnuméraires in Mém. de Paris, 1736, Hist. p. 59; *B. S. Albini* Annot. acad. Lib. IV.—VI.—*A. K. Boerhaave* Observatio anatomica musculi in pectore præternaturalis et varii in diversis corporibus inventi in N. Comment. Acad. Petropol. Vol. II. Hist. p. 23, Mém. p. 257.—*Böhmer* Observat. anat. rarior. Fasc. I. in Præfat. p. 6, Fasc. II. in Præfat. p. 5.—*Sandifort* Exercit. academ. L. I. c. 6, L. II. c. 6.—*Hildebrand* Bemerkung einer merkwürdigen Varietät am Nervo musculo-cutaneo und einiger Muskelvarietäten in *Blumenbach's* Medic. Biblioth. Vol. III. Part I. p. 176.—*Heymann* Varietates præc. c. hum. muscul. Traj. ad Viadr. 1784.—*Brugnone*, Observations myologiques in Mémoires de Turin. Sc. Phys. et Mathem. Vol. VII. p. 157.—*Rosenmüller* D. de nonnullis musc. c. h. variet. Lips. 1804.—*Zagorsky* in Mém. de l'Acad. de Petersb. Vol. I. 1809.—*Fleischmann* in d. Abhandl. der physical. medic. Societät zu Erlangen. Vol. I. No. I. 1810.—*Duille* præs. *Tiedemann* D. anat. nonnullas musculor. varietates exhibens. 8vo. Landshuti, 1813.—*Kelch* Beiträge zur pathol. Anatom. No. 20—36.—*Gantzer* præs. *Rudolphi* D. anat. musculor. varietat. sistens. 8vo. Berol. 1813.—*Sels* præs. *Rudolphi* D. anat. musculor. varietat. 8vo. Berol. 1815.—*Moser* in *Meckel's* Archiv f. Physiol. Vol. VII. p. 224.—My Selt. Beob. Part I. p. 89, Part II. p. 39.—*J. F. Meckel* in *Liman* D. de ano contra naturam. Halæ, 1822, p. 34, and in his Archiv f. d. Physiol. Vol. VIII. p. 585.—Compare also the anatomical Manuals of *Mayer*, *Sömmerring* and *Meckel*.

(3) In an acephalous monster in *Meckel's* collection. v. *de Schallhammer*, p. 27.—*v. Lenhosseck*, in the Medic. Jahrbuch d. K. K. öesterr. Staates, Vol. V. Part IV. instead of muscles, a fatty mass in a malformed child. Hardly any trace of muscle in a very mishapen monster was observed by *Peschier*, as mentioned by *Locker-Balber*, in *Hecker's* litter. annal. d. g. Heilk. 1828, Aug. p. 406; I also found jelly instead of muscle in a human monster.

(4) *J. G. Salzmann* D. s. plurium pedis musculor. defectum. Argent. 1754.—*von Bergen* D. de plurium musculorum femoris defectu. Franc. ad Viadr. 1734.—Commerc. liter. Nor. 1739, p. 22 (on the right lower extremity).—*v. Haller*. Op. minor, Vol. III. p. 33, remarks, from the observations of *Winslow* and *Ruysch*, that in supernumerary limbs, fat is sometimes found instead of muscle; this was also seen by *C. C. F. Jäger*, Ueber die Natur und Behandlung der krankhaften Schwäche des menschl. Organismus. Stuttg. 1807, p. 227. I have also noticed it four or five times in birds and calves; in a fœtus in *Meckel's* collection all the muscles of the thigh are deficient. v. *Thamm* D. de genitalium sexus sequioris varietatibus. Halæ, 1799, p. 24, fig. 1 (all the muscles of the right lower extremity wanting) *Breschet* in Medic. chir. Transact. Vol. IX. 1818, p. 433.—*Palletta* saw, in two cases, lameness produced by deficiency of the m. gastrocnemii and tendo Achilles. v. Exercit. pathol. I. p. 151.—*G. Jäger* saw several muscles very imperfectly formed in a monstrous calf. v. in *Meckel's* Archiv f. Anat. and Physiol. 1826, No. 1, p. 79.—Similar cases are described by *Clarke* in Philos. Transact. 1793, Part II.—*Vrolik* in Verhandel. van het k. Instit. 2. aflev. p. 29, and in a lamb on the hind legs.—*Schröder van der Kolk* Observ. anat. pathol. et pract. argumenti. Fasc. I. Amsterd. 1826, p. 9.—It is self evident that in imperfect formation of individual parts of the body their muscles must be deficient; thus in extensive spina bifida almost all the muscles of the back; in thoracic and abdominal clefts, as well also as in large umbilical ruptures, the muscles are often deficient. In four monsters, with deficiency of the radius and thumb, all the muscles naturally situated on the radius were absent. If an entire part of an extremity be wanting, the muscles lying on the superjacent limb, which would have moved it, are generally very imperfect.

(5) I have missed the just-named muscles several times.

(6) *Klinkosch*, Progr. quo sect. et demonstrat. indicit, &c. 4to. Pragæ, 1766, missed all of them. Several in squinting persons. v. *Wrisberg*, Götting. gel. Anz. 1781. p. 683.

(7) My Selt. Beob. Part I. p. 89, Part II. p. 39.

(8) I have lately seen this in a subject which exhibited many other varieties in the muscles.

(9) I have missed this once, in which case the m. gemellus superior was very large.

(10) Instances of this kind are described by *Tiedemann* in *Meckel's* Archiv fur Physiol. Vol. IV. p. 412; *Meckel, ib.* Vol. V. p. 115. I once saw in a subject seven supernumerary muscles, viz. on the arm, an additional head to the biceps, an anomalus faciei on each side, a double styloglossus, a sternalis brutorum, and on the thigh an anomalous muscle from the heel to the gastrocnemius.

(11) *Albinus* Histor. musculor. hom. p. 167.—*Zagorsky.*

§ 156.

The SIZE and FORM of the muscles depend in general on that of the skeleton, so that in its vices of form the muscles are found to vary very much.[1] Still, however, we observe these circumstances alone without the bones being malformed; thus we find them, congenitally, too long or too short, too broad or too narrow, too thick or too thin, unsymmetrical, &c.[2] More frequently their form varies as an acquired vice; to these belong the MORBID CONTRACTIONS, *contracturæ*,[3] arising especially in consequence of inflammatory and convulsive conditions, the SHRINKING of muscles[4] in consequence of diminished nourishment in cachetic patients, general or local in lame people, or in limbs which have been long unused from other causes, or if long-continued pressure have acted on the muscles, as in wens, abdominal dropsy, and swellings of various kinds; in such instances, thick muscles become, generally when they are simultaneously expanded, often as thin as membrane: further, the opposite vice or morbid increase from *hypertrophy*,[5] and the various kinds of swellings connected with vice of texture, as well as extension of length and breadth occurring in relaxation, which, when also the extensile causes, as tumours, collections of water, dislocations of bone, &c. cease to operate, often distinctly remain for a long time.

(1) For instance, on imperfectly developed limbs, very small. In crookedly united fractures of bone, in distortions.—A description and engraving of some cases of the latter kind, in rickety persons, is given by *Rodati*, p. 397, pl. 18.

(2) The platysma myoides, instead of being flat, has been seen thick and roundish, and extending up to the occipital bone. v. *Zagorsky*, p. 357.—I have several times found, in new-born children and animals, some of the limbs too much arched or distorted, in consequence of the unnatural shortness of certain muscles.— In congenital wry-neck, as well as in club-hand and foot, this is generally the case.

(3) *Reuss* Repertorium Comment. Vol. XII. p. 284.—*Crausius* D. de contractura. Jenæ, 1687.—*Vater* D. de contracturis. Witeb. 1696. — *Schwab* D. de contractura. Leyd. 1701.—*Prietto* D. de contractura. Budæ, 1703.—*Matthias* præs. *Reil* D. de diversis morborum localium formis ad contracturæ genus revocandis. 8vo. Berol. 1811. Compare § 24, note 1.

(4) After the bite of the Ceylon leech, malignant ulceration and great wasting of the muscles are said to arise. v. *Tytles* in Transact. of the Med. and Phys. Soc. of Calcutta. 8vo. Vol. I. 1828.

(5) Compare above, § 21, note 4.

a muscular slip from the Subclavius & the Coracoid pr
root (Nov 26 1831)

§ 157.

The POSITION and CONNEXION of muscles vary in rare cases from what is regular; this may be as well a congenital as an acquired vice. The former is the case when certain muscles have unusual points of origin and attachment; thus we find, for instance, the flexing muscles on the limbs sometimes irregularly deeply attached, and the extension of the part consequently very confined;[1] in deficient formation of the extremities, the tendons of the muscles of the terminal pieces are frequently connected with each other; in deficiency of the lower jaw, we find the masseter and maxillary muscles of the cheeks of both sides running into each other;[2] in the complete and sometimes also in the incomplete cleft belly, the tendinous membranes of the abdominal muscles are not connected at the white line; the *biventer maxillæ* has been seen attached not to the chin, but to the lateral part of the jaw;[3] the *omohyoideus* not arising from the tongue-bone, but from the second vertebra,[4] and the *stylo glossus* from the *pterygoideus internus*;[5] the *sternocleidomastoideus*, by means of the *sternalis brutorum* running into the *rectus abdominis*;[6] all the *scaleni* attached to the first and none to the second rib; the *biceps brachii* not fixed to the fore-arm, but only belonging to the upper-arm,[7] &c. To the acquired vices of situation and form, belong the various DISLOCATIONS of individual or several muscles which may be produced by tumours of different kinds, but especially by bony tumours and dislocations of bones; and without these in consequence of unnatural motions, and the rupture of their retaining ligaments and the aponeuroses surrounding them.[8]

(1) I have occasionally seen this in human, but more frequently in animal monsters, especially in calves and sheep.

(2) I have seen this formation in two human monsters, and in six monstrous sheep.

(3) *Platner* D. de musculo digastrico maxillæ inferioris. Lips. 1737, p. 14, tab. 1.

(4) *Rudolphi* resp. *Sels*, p. 4.

(5) *Moser*, p. 226.

(6) I have also once seen this.

(7) *Petit* in Mém. de l'Acad. des Sciences. 1733, p. 21.

(8) Compare *de Plouquet* Repertor. Art. Musculor. Dislocatio. — *Pouteau* Vermischte Schriften. Dresden, 1764. — De la luxation des Muscles in *Villers* et *Capelle* Journal de la Societé de Santé et d'histor. natur. de Bordeaux. Vol. I. p. 120; and *Coffinière* Observations sur la luxation des muscles, *ib.* p. 138.—*Ximenes* in Memor. Acad. de la R. Soc. de Sevilla, Vol. VI. p. 108.—*Richter's* Chir. Bibliothek, Vol. VII. p. 344.—*C. F. Ludwig* De Diastasi, No. III. Myodiastasis. Lips. 1821.

§ 158.

The usual red COLOUR of the muscles not unfrequently varies from the normal in both ways, and is naturally, though

not always, proportioned to the quantity and state of the cruor contained in the blood. The muscles are therefore, in all those diseases in which the quantity of blood and its contained cruor are greatly diminished, much paler than usual; thus in almost all cachexiæ of man and animals, as lameness, dropsy, wasting, in rickets, tubercular disease, &c.; further, in individual parts more or less used, as in wry-neck, club-foot, and anchylosis, in which the muscles are in a state of inactivity, they often become very pale and white, appear almost similar to the breast muscles of fowls; and on the contrary, muscles which are more used are often very pale from bleeding; also in several changes of texture, as in their conversion into fat, in induration from inflammation, and in scirrhus, the colour of the muscles becomes unnaturally light. The opposite vice, or the too great redness and colour of the muscles, is not less common; thus, for instance, they are very red naturally in all persons who are hanged, drunk, stiffled, destroyed by narcotic poisons, &c. on account of the great congestion of blood; further, in all inflammatory diseases of men and animals, in consumption, &c., dark or purple-red; also bluish-red in typhus and many plague-like diseases of man and animals, especially in yellow fever[1] and mortification of the spleen; also in the blue disease, they are sometimes dusky-red,[2] and in scorbutic persons, of a soot-like dark colour. In other cases, we find them coloured yellow or brownish-red, and if depositions of blood or destruction from mortification occur, they then become dark-brown and blackish.

(1) *Laso* Colleccion de inspecciones anatomicas relativas a la fiebre amarilla. 4to. Cadiz, 1824.

(2) I have seen this in two instances.

§ 159.

The CONSISTENCE of muscles also varies exceedingly. We find it diminished in many cachetic diseases, particularly in long continued and general dropsies; in the continued rest of a part, especially in paralytic limbs, in *cholera morbus*,[1] in putrid fever, plague of every kind, mortification of the spleen, &c.;[1*] also in the glanders of horses and in tubercular diseases, the muscles are often very flabby, withered, and soft; so again in hunted animals, and such as are killed by lightning; finally, it must be understood that they often exhibit much diminished consistence together with the changes of texture. The opposite vice, or too great solidity, firmness, and dryness of the muscles, is not merely the consequence of vice of texture, but occurs also without it, in rare cases, in a high degree, sometimes locally, in muscles which have been contracted

and compressed for a long time, and sometimes generally; they have been thus found extremely dry,[2] once in a hydrophobic patient, and once in an idiot, dark, bloodless, very hard and as dry as cured flesh.[3]

Vices of consistence occasionally give rise to VICES OF CONTINUITY,[4] which, however, are more commonly the consequence of mechanical violence. To the latter belong, not merely the various flesh-wounds, the violent rupture of muscles,[5] the separation of their connexion by suppuration, &c.; but also the more rare separation of the fleshy fibres by substances penetrating them,[6] and the spontaneous rupture of individual muscles by violent exertion.[7]

In all these cases is the perfect or imperfect division of connexion, and the consequent loss of substance repaired by a reddish jelly-like substance being poured out, which at first is converted into a vascular and reddish cellular tissue, subsequently becomes compressed, lighter in colour, solid and devoid of vessels, produces the union of the two divided portions, and thus the use of the muscle is perfectly restored; in man and animals,[8] however, this structure does not consist of true muscular substance.[9]

(1) *Davy* s. Neue Sammlung auserl. Abhandl. zum Gebrauche prakt. Aerzte Vol. VI. Part II. p. 302.

(1*) [A remarkable instance of the softening of the muscles in a person who had painters' colic, is mentioned by *Dehaen*, Ratio medendi; and another person, similarly circumstanced, is stated by *Barthez*, to have had the firmness of the muscles restored, when the paralysis subsided. v. *Andral* Précis. d'Anat. Path. Vol. I. p. 220. T.]

(2) *Morgagni* De sedib. et caus. morbor. Epist. VIII. Art. 30.

(3) My Selt. Beob. I. p. 92.—An interesting case of hardening, without vice of texture, is noticed by *Isenflamm.* v. Versuch über die Muskeln, § 159.

(4) For instance, rupture of the heart, the womb, the bladder, &c. from softening of their fleshy parts.

(5) I have in a few cases, of persons who have been run over, or who have fallen down dead, observed some of the muscles torn. This occurs also in violent pressure of the air from explosion of gunpowder, &c. If parts of the extremities be lacerated by mills, or other machinery, the tendons are sometimes torn out above the common point of separation, even up to the heads of the muscles, as I have seen in one instance.—[In one instance, I saw the upper portion of the rectus abdominis ruptured by the shaft of a cart, without injury to the common integuments: a ventral rupture was the consequence. T.]

(6) In the alimentary canal, the urinary bladder, and the arteries, the internal membrane protrudes between the divided muscular fibres. The same also occurs in the abdominal muscles in ruptures, and in very fat persons.

(7) Compare *de Plouquet* Repertor. Art. Musculor. Ruptura et Dislocatio fibrarum; and *Reuss* Repertor. Comment. Vol. XIV. p. 387; also *Janson* D. sur les ruptures des tissus et des organes du corps humain. 4to. Paris, 1813.—*Fleischmann* Leichenöffnungen. Erlangen, 1815, p. 211.—In a person struck by lightning, v. *Ouvrard* in Nouv. Journ. de Médec. Chir. et Pharm. Paris, Dec. 1822.—*Larrey* Mém. de Chir. milit. Vol. III., the rectus abdominis in tetanus.—*H. F. Isenflamm* Anatom. Untersuchungen, 1822, p. 173.—*Roulin* Du mécanisme des ruptures musculaires in *Magendie* Journ. de Physiol. expérim. Vol. I. No. 3, p. 295.—*Chaussier* Recueil de Mémoires, Consultations et Rapports sur divers

objets de Médecine légale, p. 402. 8vo. Paris, 1824. — *Richerand* Grundriss der neuern Wundarzneikunst, a. d. Fr. v. *Robbi.* Vol. VIII. Leipz. 1824. — *Martin* in *Rust's* Magaz. f. d. ges. Heilk. Vol. XIX. p. 590. — *Boyer* Traité des Maladies chirurgicales. 8vo. Paris, 1822—1826, Vol. XI. Chap. 3, the right M. rectus after vomiting. — *Flaubert* in Répertoire génér. d'Anat. et de Physiologie pathologiques, 1827, Vol. III. Part I. p. 124, rupture of the pyriformis, of the gemelli, and of the quadratus femoris, caused by dislocation of the hip outwards or inwards. — I consider the case of *Kelch*, No. 37, which has been often observed, to have taken place after death, as in it all the marks which accompany rupture during life, viz. effusion of blood and inflammation, were absent.— I have once seen after spasm, the omohyoideus torn; and a few times also, other muscles. v. Selt. Beob. I. p. 92. Verz. No. 2175.

(8) It is well known, that in the lower animals, muscular fibres also are reproduced in regenerated parts. However, I find that in the reproduced tails of lizards, the muscles still remain, for many years, more imperfect than the original.

(9) Compare the notices given above, § 56, note 1; also *Kleemann* D. s. quædam circa productionem partium corp. hum. Halæ, 1786. — *Schnell* præs. *Autenrieth* D. de natura reunionis musculorum vulneratorum. Tubing. 1804.— *F. Paul* Comm. physiol. chir. de vulneribus sanandis, in certam. lit. præm. ornata. 4to. Gött. 1825, with two engravings.

§ 160.

Among the VICES OF TEXTURE of the muscular system, INFLAMMATION, *myositis*,[1] arises very generally both from internal and external causes; so also its usual consequence, SUPPURATION, which, according to the difference of its causal proportions, its seat and extent, assumes the most varying forms;[2] and GANGRENE, which often destroys very large masses of flesh. SOFTENING of the muscles, in consequence of inflammation or uncertain proportions of mixture, is much less common; it occurs in the muscular coats of the alimentary canal and urinary bladder at the same time, with softening of the other coats of the aforesaid parts, and in softening of the stomach secondarily in the diaphragm; it occurs in the muscles of the lips and cheeks in watery cancer, and even in the large muscles, and sometimes attains such an extent, that a muscle is converted either entirely or partially into a slimy, purulent, bloody, jelly-like, pappy, or fungous mass. The CONVERSION OF MUSCLES into TRUE FAT[3] is more frequent, by which ultimately the fibrous structure of the part is entirely destroyed; this vice occurs especially on the lower extremities,[4] particulary in the gastrocnemii, in anchylosis and other diseases of the knee-joint; so also in fat people, there is frequent paleness of the muscular fibres by the simultaneous deposition of fat in the muscular tissue. The consistence of the muscles in this disease, as naturally as frequently, though not always, diminishes their size. HARDENING of the muscles, with change of their tissue, is always the consequence of inflammation, and the exudations thereby produced into their interior, and often occurs as well in the voluntary as in the

involuntary muscles, and in very different degrees; usually also with some swelling. Should this state be longer continued, and the hardening become more distinct, then the muscles become whitish, entirely lose their usual texture, and assume a leathery and even tendinous or cartilaginous appearance.[5] The OSSIFICATION of muscles, that is, the actual conversion of muscular fibre into bony substance, does not appear to occur;[5*] although frequently, and especially in old and gouty persons, we observe BONY AND STONY CONCREMENTS, which, however, are always seated merely in the cellular tissue between the muscles, and appear in very different number, size, and form.[6] SPURIOUS PRODUCTIONS are extremely uncommon in the muscular system; to these belong, TUBERCLES, which sometimes occur in the involuntary and more rarely in the voluntary muscles;[7] further, LIPOMA,[8] and other TUMOURS,[9] for example, MEDULLARY SARCOM, which usually render the neighbouring parts gangrenous,[10] and SCIRRHUS, which attacks the muscular system but only secondarily, and changes it into a solid, whitish fibrous substance, which subsequently runs into malignant ulceration.

(1) *de Plouquet* D. de myositide et nevritide. Tübing. 1790.—A very confined motion may easily occur, in consequence of inflammation of muscles, their adhesion with each other, with the aponeurosis and with the skin.

(2) I have described two cases of a peculiar kind of suppuration in muscles, in my Selt. Beob. Part II. p. 40. The most important kind is *psoitis*, on account of its frequency and consequences, of which we must speak further, when on the abdominal and pelvic cavities.

(3) Myodemia of *Lobstein*. v. Compte rendu, etc. Strasb. 1820, p. 32.—[Steatosis of *Cragie*. v. his Elements, p. 498. T.]

(4) I have never seen the true conversion of muscle into fat, as has *Lobstein*, in any other parts than on the extremities. It is, however, said to occur in other parts, and even to take place in all the muscles at once. v. *Saillant* Mémoire sur la Maladie de veuve *Melin*. Paris, 1776.—Several instances of this disease have been collected by *de Plouquet*, in his Repertorium, and by *Reuss*, in his Repert. Comment. Vol. XIV. p. 170.

(5) I have seen the latter in the foot of a man, who was destroyed by elephantiasis. v. No. 2168 of my Verzeich.—In a child, of which the skin had become remarkably hard, the muscles also participated in the hardness. v. *Baillie's* Works, edited by *Wardrop*. 2 vols. 8vo. London, 1825. Vol. I.— [*Andral* saw, in one instance, the sterno mastoid muscle converted, throughout its whole extent, into a fibrous structure, exactly similar to its own lower tendon, Vol. I. p. 275. T.]

(5*) [*Tavernier* in *Andral* Préc. d. Anat. Vol. II. Part II. p. 571, gives an account of ossification of the diaphragm to the extent of three inches by three inches and a half, in which he states, that no trace either of muscular or fibrous structure existed at that part; and concludes, "Dans ce cas il semble evident que le diaphragme lui même était le siège de la transformation cartilagineuse et osseuse. T.]

(6) Sometimes they are remarkably large; to wit, as long as the finger. v. Phil. Trans. 1741, No. 461.—I saw a similar concretion at *Rudolphi's*, on the thigh. I once found a large one, two inches long, and above an inch broad, upon the diaphragm. v. my Selt. Beob. Part I. p. 93.—I have frequently found smaller ones.—*Cerutti*, in his Beschreib. der pathol. präparate zu Leipzig, relates

(2) For instance, Distoma isostomum and cirrigerum in the flesh of crabs, even in the claws, and D. duplicatum in the foot of the anodonta. v. *von Bär* in Nov. Act. Nat. Cur. Vol. XIII. Part II. p. 553 and 559.

(3) I found the cysticercus cellulosæ throughout almost every winter in one or several subjects, sometimes numerous, at other times but few; but I never saw cysticerci in the muscles of the head. Perhaps these animals give rise to the formation of the very rare, little, thick-coated, tough cysts filled with fluid. v. my Selt. Beob. Part I. p. 93.

(4) Compare above, § 73.

NINETEENTH SECTION.

Of the Vascular System.

FIRST CHAPTER.

Of the Pericardium.

§ 162.

The vices of formation which the PERICARDIUM but rarely presents,[1] are mostly in close connexion with those of the heart itself, to which it merely serves as an investing membrane, and a mean of attachment. The pericardium, therefore, is not only always completely deficient if the heart be wanting, but commonly also if the heart be exterior to the chest;[2] yet sometimes it is either wholly[3] or partially[4] wanting, although the heart exists and is situated within the chest.

The SIZE and FORM of the pericardium depends partly on that of the heart, partly on that of the chest, and of the neighbouring soft parts. Sometimes it is found VERY LARGE, if in monsters it contain two hearts, or more commonly if it be MORBIDLY DISTENDED, as in swellings of the heart and of the origin of the aorta, as well as in collections of fluid or of air in it. Very rarely the extension is so great at a particular spot, that a *diverticulum* is produced.[5] In many instances, especially in monsters, it is found, at the time of birth, as imperfectly developed and THIN as in the early stage of fœtal existence; in other cases, it is observed unnaturally thin at a later period, in consequence of atrophy. The opposite vice, viz. the TOO GREAT THICKNESS, is much more frequent, which, however, seems to occur only in disease.

(1) *M. Hoffmann* D. de pericardio. Altd. 1690.—*Luther* D. de pericardii, pulmonum et partium genitalium anomaliis. Kil. 1704.—*A. B. Heimann* D. de

(1) I remarked this several times, particularly in large umbilical hernia.
(2) Compare § 162, note 2.
(3) Compare my Selt. Beob. Part I. p. 94.—Sometimes in equal size of the heart the diameter of the point of attachment is only one and a half, often also four inches. The first vice forms the transition to the more unattached position of the pericardium in mammalia.
(4) *Stoerck* Annus I. p. 108.
(5) *Stoll* Ratio medendi.

§ 164.

The CONSISTENCE of the pericardium, which is sometimes considerably lessened by disease, and may also be increased, falls but very seldom under consideration, on account of its protected position and its pliancy. In a few instances it has been seen torn by external violence, not by any thing piercing it, but merely by CONCUSSION;[1] more frequently however, it is INJURED by bullets, pointed instruments, broken ribs, and pointed substances which have been SWALLOWED; and it has been marked by CICATRICES,[2] the consequence of such wounds as have not been mortal. It is very remarkable, that in some few instances the pericardium is found as dry as if it had been long exposed to the air;[3] and this has even sometimes been observed in cases of hydrophobia, both in man and animals.[4]

(1) *Boneti* Sepulchret. Lib. IV. Sect. 3, Obs. 27.—*Danz* in *Stark's* Archiv. Vol. III. Part III. No. 2. — In a healthy young man, the heart completely burst the pericardium, without any injury to the chest, in consequence of a blow on the breast from the wadding of a small cannon; in a morbid examination at the Med. Coll. of Silesia.
(2) *de Hautesierk* Recueil d'Observations de Médecine. Paris, 1772, Vol. II. p. 600.—*Bongon* v. *Rust* and *Casper* Krit. Repert. f. d. ges. Heilkunde, Vol. VI. Part III. p. 474.—Compare the cases of cured wounds of the heart, related by surgeons.
(3) *Boerhaave's* Pathological treatises on the Heart, in the Sammlung auserles. Abhandl. prakt. Aerzte, Vol. IX. p. 495.—*Hunter*, *Sömmerring*, and *Baillie's* Morbid Anatomy.—I once found it in an asthmatic person as dry as parchment, only on the left side.
(4) *Capivacci* Practic. L. VII. c. 12, p. 1085.—*Brechtford* v. Acta med. Havn. Vol. V. Obs. 144, 1677.—*Taury* in Mém. de l'Acad. de Paris, 1699, p. 55.—*Gherardini* Samml. für prakt. Aerzte, Vol. XV. p. 96.—*Andry* Untersuchungen über die Wuth nach dem Bisse toller Thiere. Leipz. 1785.—*Ferriar* Medical Facts and Experiments. Vol. I. London, 1791.

§ 165.

Among the VICES OF TEXTURE of the pericardium, its INFLAMMATION, *pericarditis*,[1] is the most important. This disease, according to the diversity of its causes,[2] its acute or chronic course, its degree and extent, exhibits many varieties; it, however, always shows itself by tumefaction, loosening, and more or less redness. A morbid EXUDATION of lymph-like fluid and fibrous substance on the inner surface of the pericardium is the usual consequence of inflammation of that membrane. From the fibrous substance are produced false

of which the pericardium had become remarkably narrow, and in meagreness of other parts of the body I have found very much fat in the pericardium.

(2) *Rolfinck*, Epitome method. cognosc. c. h. affect. p. 164.—*Boneti* Sepulchret. L. II. Sect. VIII. Obs. 6, L. III. Sect. XXI. Obs. 21, § 14. Sect. XXXVII. Obs. 3, § 12.—*Heuermann* Physiologie, Vol. I. p. 202.—*Richter* Deutsche Biblioth. Vol. IV. p. 239.—*Steinbuch* De tænia hydatigena, 1802, p. 5.—*Bernhardi* Observat. circa ingentem cordis tumorem. 8vo. Regiomonti, 1826, p. 22.—Here also perhaps belongs the case of a cyst filled with lymph in a monkey. v. *Galenus* De loc. affect. L. V. c. 2.

(3) Compare § 81. I have found this twice, and in the one case, at the same time with loose cartilages. v. my Verzeichn. No. 2183 and 2184.

(4) The case related by *Lancisius* de Aneurysm. L. I. propos. 5, seems to belong here.—*Senac*, Vol. II. p. 340, found a meliceris.—*Portal* Cours d'Anatomie médicale, Vol. III. p. 23.

(5) I have twice found this, once in a child and once in a monkey.—*Luchtmann's* Samml. auserles. Abhandl. Vol. XVII. p. 210.—*Baillie* found two or three such tubercles, one of which was as large as a walnut; he also found two tubercles as big as hazelnuts on the side of the heart. v. his works, edited by *Wardrop*, Vol. I. London.—*Macmichael* in London med. and phys. Journ. Aug. 1826.—Perhaps we may here include the cases mentioned by *Zacutus* Prax. adm. L. II. Observ. 137.—*Galenus*, in a fowl.—*Dionis*, v. *Lieutaud* hist. anat. med. Vol. II. p. 271.—*Bourru* in Hist. de l'Acad. de Paris, 1763, p. 35.—*Haller* Op. minor. Vol. III. p. 365.—Nov. Comm. Petropol. v. *Voigtel* Path. Anat. L. II. p. 220. *C. Bell*, System of Dissection, &c. Edinb. fol. 1798.—*Laennec* De l'auscultation médiate. Vol. II. p. 397. Paris, 1819; also in an ox.—*Musgrave*, in Phil. Transact. 1685. p. 860.

(6) In a case of medullary sarcoma in the posterior mediastinum not only was the posterior part of the pericardium affected, but even perforated by it. In an old woman, whose arm was amputated on account of fungus hæmatodes, medullary sarcom was found on the pericardium and heart. v. *Gerson* and *Julius* Magaz. der ausländ. Literatur d. g. Heilk. 1823, Sept. Oct. p. 199.

§ 167.

Finally, as to the vices of CONTENTS, we must first notice the collections of gaseous and lymph-like fluids which are mostly the product of morbid irritation or of an inflammatory condition; the collection of AIR[1] in the pericardium is not often observed without existing decomposition; but sometimes, however, it is observed in such degree that the membrane appears inflated. The collection of WATER or DROPSY of the PERICARDIUM, *hydrops pericardii, hydropericardion*,[2] is much more common. It is generally found accompanying dropsy in other parts, but rarely alone, and varies considerably with respect to the quantity, colour, and consistence of the collected fluid.[3] In inflammation of the pericardium and its consequences, distinct extravasations of PLASTIC LYMPH or FIBRINE are frequently seen on the heart, which float in the greater or less quantity of water in the form of flakes and lumps; or, on the contrary, if it be coagulated into cells, the water is contained in them; or, finally, becomes thicker, and assumes the appearance of a pus-like substance.[4] If ulcers are found on the pericardium or heart, true PUS[5] is seen on the former, which, however, in rare cases makes its way from the neighbouring

parts[6] into the pericardium,[7] as it can in like manner make its way out of the pericardium. When the heart or the blood-vessels are injured, or burst within the pericardium, that membrane is naturally found more or less filled with fluid or coagulated BLOOD;[8] still we sometimes find in the pericardium bloody water or actual blood, without any other cause than mere transudation.[9] Sometimes blood is poured out between the layers of the pericardium, and forms larger bladders of blood,[10] or smaller petechial spots.[11] FIBRO CARTILAGINOUS[12] and STONY[13] CONCRETIONS are very rarely observed loose in the cavity of the pericardium; these very probably have had their origin in peduncular tumours, which had been subsequently broken off.[14] Lastly, in the pericardium of beasts, ENTOZOA have been found.[15]

(1) Compare § 51.—*Hollerius* de morb. int. L. I. c. 29, p. 129.—*Hercules a Saxonia* Præl. pract. C. 1, p. 2.—*Bartholin.* v. *Lieutaud* Hist. anat. méd. sect. 1, Obs. 1672.—*Ballonius* paradigmata, No. 96.—*Senac*, L. VI. c. 3.—One case in Med. Chir. Rev. 1825.—*Brière* in Nouv. Biblioth. Febr. and March, 1826.—In my Selt. Beob. some good instances.

(2) See for single cases in *de Plouquet* Repert. Art. Hydrops pericardii, and *Reuss* Repertor. Comment. Vol. XIII. p. 561.—*Schellhammer* D. de aqua pericardii. 1694.—*Fr. Hoffmann* resp. *Grætz* D. de hydrope pericardii rarissimo. Halæ, 1697.—*Mercker* D. de hydrocardia. Ultraj. 1711.—*Westring* in K. Svenska Vetensk. Acad. Nya Handl. 1790, Vol. XI. p. 292.—*Landvoigt* D. de hydrope pericardii dignoscendo. Halæ, 1798.—*Heinecke* D. de hydrope pericardii. Erford, 1799.—*Modes* D. Essai sur l'hydropisie du péricarde. Paris, 1808.—In rare cases we find the water between the layers of the pericardium itself. v. *Portal*, Vol. III. p. 11, note 2.—*Morgagni*, Epist. XVI. p. 44; XXV. p. 16; and *Portal*, p. 28, have improperly asserted that dropsy of the pericardium may arise from ruptured hydatids.

(3) The quantity varies from some spoonfuls to two or three pints. v. *Frank*, p. 243. — *Corvisart* Sur les Maladies et les lésions organiques de cœur. 8vo. Paris, 1806; translated by *Hebb*, London, 1813.—[In a case of hydrops pericardii, related by *Wood*, in London Med. and phys. Journ. Vol. LXI. p. 406, two quarts of lymph were effused. T.] The COLOUR is sometimes light and clear, more frequently yellow or brownish, even reddish, viz. commonly in bilious and putrid fevers; milky in metastasis of the milk in lying-in women, &c. The CONSISTENCE is often very mucous, albuminous-like, &c. A moderate quantity of water in the pericardium does not necessarily lead to the conclusion, that disease existed during life, since here, as in other serous cavities, it is often first effused in the very moment of death.

(4) Compare § 55. The coagulum lying loosely in the pericardium, improperly called polypus by *Hohnbaum*, v. Heidelberger klinische Annalen, Vol. I. Part III. p. 414, undoubtedly belongs here. [According to *Elliotson*, On Diseases of the Heart, p. 8, the quantity of serum effused in acute pericarditis is far less in proportion to the fibrine than in pleurisy, rarely amounting to a pint: on the contrary, in chronic disease the fibrine, if any, is thin and soft. T.]

(5) The older and even more modern authors often confound pus with puriform coagulable lymph, therefore their observations are not to be relied on. Compare the cases described at § 165, note 4. — *A. Monro*, in his description of all the bursæ mucosæ, &c. Edinburgh, 1788, p. 41, states, that after an injury with a red-hot iron, he found five ounces of pus in the pericardium.

(6) For instance, from abscess of the liver, through the diaphragm; Nov. Acta, Nat. Cur. Vol. VIII. Obs. 9, and *v. Siebold* Samml. chir. Beobachtungen Vol. I. p. 248.—*Chaussier* in Bulletin de la Faculté de Médecine, 1811, No. 5, p. 98.

In Philadelphia medical Journal.—I once found in an abscess in the anterior mediastinum some pus penetrating through a delicate fistulous orifice into the pericardium.

(7) From abscess between the ribs. v. *Sabatier* in Mémoires de l'Institut de France, Sciences mathém. et physiques, 1807, p. 104.—*Fabricius* in *Harless* Rhein. Jahrb. der Med. und Chir. Vol. I. Part I. p. 156.

(8) Tolerably frequent in rupture of the heart, and of aneurysmal bags in the aorta; more rarely in bursting of the arteria innominata.—*Meyer* in Oesterr. medic. Jahrbücher, Vol. V. Part III. p. 61, the coronary veins. v. Commercium Litt. A. 1732, Hebd. 41, No. 4.—Acta Nat. Cur. Vol. II. Obs. 107, Vol. V. Obs. 37.—*Viridet*, v. *Haller* Bibl. chir. II. p. 103.—*Hedlund* in Svenska Läkare-Sällskapets Handlingar, Vol. III. p. 181, on the v. cavæ and pulmonal. v. *Morgagni*, Epist. XXVI. 27, 28.—*Syl* Aufsätze und Beobachtungen, Vol. IV. p. 34.—*Portal*, v. Auserlesene Abhandlungen, Vol. XII. p. 724.—*Doubleday* in Medical Observat. and Inquir. Vol. V. p. 144.—*Wright* in *ibid*, Vol. VII. No. 1, on one side of the vena cava. v. *Salzmann* D. de morte subita ex sanguine in pericardium effuso. Argentor. 1731.—Sometimes the openings from the blood-vessels into the heart are very small, viz. in two instances before noted in my Selt. Beob. Vol. II. p. 60 and 66.—*Villesavoye*, v. Fränkische Sammlungen, Vol. II. Part II. p. 312.—*Arnott* in London med. and phys. Journ.—*Abercrombie* in Transact. of the med. chir. Society of Edinb. Vol. I., &c.

(9) Compare § 51.—*Lieutaud*, Vol. II. Obs. 659.—*Vater* in Miscell. Nat. Cur. Dec. III. Ann. IX. p. 293.—*Bader* Observ. med. incisionibus illustratæ, 1762. Observat. 1. in *Sandifort* Thesaur. Diss. Vol. III.; *de Haen* Ratio Medendi, Vol. IX. cap. 1, § 6.—*Thomson* in Medical Observat. and Inquiries. Lond. 1771, Vol. IV.—*Hooper* in Mem. of the med. Societ. of London, Vol. I. No. 18.—*Alston* in Med. Essays and Observat. by a Soc. in Edinb. Vol. V. Part II. p. 609.—*Testa*, p. 294.—My Selt. Beob. Vol. I. p. 95, and a few times since, among others also in a stag.—*Hufeland* and *Harless* Journ. d. prakt. Heilk. 1815, Part I. Jan. p. 85.—*Fitzpatrick* in London Med. Repos. 1822, April, p. 295.—*Copland*, *ib.* p. 298.

(10) *Morgagni* Epist. XXIII. 23.—*de la Faye* in Hist. de l'Acad. de Paris, 1735, p. 20, 21.

(11) *Stoll*, Ratio medendi. In a man who died of asthma I observed some little effusions of blood between the layers of the pericardium. Do the CYSTS observed by *Wrisberg* in his Comment. med. physiol. anat. et obstet. arg. Vol. I. No. 4, belong here?

(12) My Selt. Beob. Part II. No. 19, p. 45, and Verzeichn. No. 2184.

(13) *Lanzoni* in Miscell. Nat. Cur. Dec. III. Ann. VII. and VIII. 1699 and 1700, Obs. 75, p. 129, three stones.

(14) Compare above, § 82.

(15) Especially in pigs, the echinococcus veterinorum *Rud.*—In the pericardium of the mya pictorum, and various kinds of anodonta, the aspidogaster conchicola. v. *Baer* in Nov. Act. Cur. Vol. XIII. Part II. p. 527.

SECOND CHAPTER.

Of the Heart.

§ 168.

The DISEASES of the HEART,[1] both those which are congenital and those which are acquired, are not of rare occurrence. The former, or vices of formation, depend partly on the earliest

Mayor Mayarnet Edwd – M.D. – Relation of a strange Monster or Serpent found in the left ventricle of the Heart of John Pennant Gent. London 1639 4to
1689 4to

form and structure of the heart itself, and are true retarded formations; the latter are oftentimes the consequence of recurring sympathetic irritation, which, in passionate men, arises from the brain, in others, often also from the respiratory or the digestive organs. Therefore, diseases of the heart are more common in the male sex, in elderly persons, and perhaps also in criminals, and in diseases of the mind;[2] sometimes mechanical causes, and among these, especially in the malformation of the chest and of the spine, and even hereditary disposition also,[3] give rise to them.

(1) *C. a Vega* De cordis et thoracis affectibus in de arte medendi. fol. Lugd. B. 1564.—*C. Bruno* De corde et ejus vitiis. 4to. Basil. 1580.—*Ryff* D. de affectibus cordis. Basil. 1584.—*Rudius* De naturali et morbosa cordis constitutione. 4to. Venet. 1600.—*Montaguana* Consilia de ægritudinibus cordis i. Op. select. fol. Francof. 1604.—*Albertini* De affectibus cordis. L. III. 4to. Cesena, 1648.—*A. Bulgetius* De affectionibus cordis. 4to. Patav. 1657.—*ab Hartenfels* Pr. de corde, ejusque affectibus. Erford. 1697.—*Barbeyrac* D. nouvelles sur les maladies de la poitrine, du cœur, etc. 8vo. Amstel. 1731.—*J. F. Meckel* Sur les maladies du cœur in Mém. de l'Acad. des Sc. de Berlin. 1775, p. 56; 1776, p. 31.—*Juncker* and *Bockmann* D. cordis morbos proprios in tabula exhibens. 4to. Halæ, 1763.—*Spaventi* D. de frequentioribus cordis, majorumque vasorum morbis internis. Vienn. 1772.—*Senac* Traité de la structure du cœur et de ses malad. Par. 1749; ed. *Portal.* 4to. Vol. II. Par. 1778.—*H. Boerhaave* in Genees-Natuur-en Huishoudkundig Kabinet. door *J. Voegen van Engelen.* Leid. 1779. Deel. I. p. 562.—*de Petraglia* De cordis affectionibus syntagma. 8vo. Romæ, 1779.—*J. G. Walter* Sur les maladies du Cœur in Nouv. Mém. de Berlin. 1785, Mém. p. 57.—*Reil* Analecta ad historiam cordis pathologicam. 4to. Halæ, 1790.—*J. F. Meckel* De cordis conditionibus abnormibus. 4to. Halæ, 1802; and in *Reil's* Archiv für Physiologie, Vol. VI. p. 549.—*Cabirau-Cabannes* Aperçu sur quelques affections organiques du cœur, etc. 8vo. Paris, 1805.—*F. Zuliani* De quibusdam cordis affectionibus. 4to. Brix. 1805.—*le Herissé* Propositions sur les affections organiques du cœur. 4to. Paris, 1806.—*Corvisart* Essai sur les maladies et les lésions du cœur et des gros vaisseaux. Paris, 1806, 1812, and 1818.—*Coutelle* D. Essais sur quelques causes de maladies du cœur. Paris, 1808.—*Harnier* D. de morborum cordis diagnosi. Gött. 1809.—*Warren,* Cases of organic Diseases of the Heart, with Dissections, and some remarks intended to point out the distinctive symptoms of these diseases. Boston, 1809.—*Allan Burns,* Observations on some of the most frequent and important Diseases of the Heart, &c. Edinb. 1809.—*Testa* Delle malattie del cuore, loro cagioni, specie, segni e cura. Vol. III. Bologna, 1810, 1811.—*Pelletan* Mém. sur quelques maladies et vices de conformation du cœur in Clinique chirurgicale, Paris, 1810, Vol. III.—*Grassal* D. sur quelques affections organiques du cœur. 4to. Paris, 1810.—*Sandberg* D. de vitiis cordis. Edinb. 1813.—*Farre,* Pathological Researches in Medecine, Essay I, on malformations of the human heart, illustrated by numerous cases and 5 plates, containing 14 figures. 8vo. Lond. 1814.—*J. Gorgham,* On organic Diseases of the Heart, with Dissections, in New England Journ. of Medic. and Surgery. Boston, 1814. Vol. III. Jan.—*F. L. Kreysig* Die Krankheiten des Herzens, systematisch bearbeitet, u. s. w. Vol. III. Berlin, 1814.—1816.—*J. F. Meckel* Tab. anat. pathol. Fasc. I. Cor. fol. Lips. 1817.—*G. Foster* D. de organicis vitiis cordis. Edinb. 1819.—*Lueck* D. Adumbratio morborum cordis generalis. 8vo. Berol. 1819.—*Mayer* Berichte über organische Fehler des Herzens under grösseren Blutgefässe in d. Oestreich. medic. Jahrb. Vol. V. Part III. 1819, p. 59.—*Laennec* De l'auscultation médiate, ou traité de diagnostic des maladies des Poumons et du Cœur. Vol. II. Par. 1819 and 1826.—*Wetzler* Ueber Krankheiten des Herzens und der Arterien in his Beiträgen zur theoret. u. prakt. Medicin. Vol. I. Part I. and II. Mainz, 1820.

J. A. Walter D. de variis cordis affectibus. Halæ, 1821.—*Reeder*, Practical treatise on the inflammatory, organic, and sympathetic Diseases of the Heart. Lond. 1821.—*J. Whitsed* D. de fabrica cordis vitiosa. Edinb. 1823.—*Wedemeyer* in *Rust's* Magazin f. d. ges Heilk. Vol. XIII. Part II. p. 177.—*Abercrombie*, Contributions to the pathology of the heart, in Transact. of the medico-chir. So. of Edinb. 1824, Vol. I. p. 1.—*M. A. Petit* Essai sur la Médecine du Cœur, etc. second edit. Lyon, 1824.—*Bertin* Traité des maladies du cœur et des gros vaisseaux, rédigé par *Bouillaud*. Paris, 1824, with six engravings.—*Bürger* Diagnostik der Herzkrankheiten. Berlin, 1825.—*C. H. Parry*, Collections from the unpublished medical writings, Vol. II. p. 129. Lond. 1825.—*R. Adams* in Dublin hospital Reports and Communicat. 1827. Vol. IV. No. 19.—*Faber* in *Hufeland's* Journ. d. prakt. Heilk. Aug. 1827, p. 3.—*Stadelmeyer* D. de morbis cordis organicis observationes quædam. 8vo. Wirceb. 1827.—*J. Brown*, Med. Essays on fever, inflammation, rheumatism, diseases of the heart, &c. 8vo. London, 1828.—Many single cases in *de Plouquet* Repertor. Art. Cordis morbi; in *Reuss* Repertor. Comment. Vol. X. p. 87, Vol. XII. p. 304, and in the periodicals. [*Andral* in Précis d'Anat. Pathol. Vol. II. p. 275, Maladies du Cœur.—*J. Elliotson*, On the recent improvements in the art of distinguishing the various Diseases of the Heart. fol. plates. London, 1830. T.]

(2) Compare *J. E. Greding's* Sämmtl. medic. Schriften, edited by *C. W. Greding*. Graiz. 1790. Vol. II.—*Nasse* in Archiv f. medic. Erfahr. von *Horn*, *Nasse*, and *Henke*, 1817, July and August. — *Weber* in *Nasse's* Zeitschrift f. Psychische Aerzte, 1820. Vol. II. p. 396. — Diseases of the heart, however, according to *Georget* Sur la folie, p. 496, Paris, 1820, are rare in insane persons, which is confirmed by my experience.

(3) Several instances are given by *Lancisi* De aneurysm. L. II. Prop. 47, p. 74; and by *Testa*, p. 45, *Frank*, *Abernethy*, &c.—I knew a woman who died of disease of the heart, in the prime of life, having had two daughters affected with disease of the heart, one grand-child the subject of the blue disease, and another, which from youth, had a violently pulsating heart.

§ 169.

The DEFICIENCY OF THE HEART, *akardia*, is observed, although not as a constant, yet as a common and regular phenomenon in headless monsters, even when they possess the chest and neck of the trunk.[1] In other embryons with heads there exist but few instances of deficiency of the heart.[2] The opposite vice, or DOUBLE HEART, is, in double monsters with a single chest, naturally not uncommon, particularly if the upper part of the body be double. The degree of duplication is therefore very different, since the heart common to two bodies is very large, or sends off double vessels, or is even itself double;[3] or in the higher grades, two distinct hearts may be contained in one pericardium, or each may be enclosed in its own proper membrane, and more or less removed from each other. Cases very rarely occur in which, in a single body, the heart has been found double, either in certain parts,[4] or entirely.[5] The latter has been several times noticed in birds.[6]

(1) *J. F. Meckel* Handbuch der pathol. Anatomie, Vol. I. p. 162.—*F. Tiedemann* Anatomie der kopflosen Missgeburten. fol. Landshut, 1813, p. 69, § 75.—*Béclard* Mémoire sur les fœtus acephales. 8vo. Paris, 1818; and in *Leroux* Journ. de Médec. 1815 and 1816. — *E. Elben* D. de acephalis s. monstris corde carentibus, p. 84. 4to. Berol. 1821, with 22 lithogr. tab. — The two last authors believe that the heart is always wanting in acephala.—*Jagorsky*, however,

found a rudiment of it. v. Nov. Acta. Petropol. Vol. XV. 1806, p. 45, ff.; and *Vallisneri* in *Malpighi* Op. posthuma. fol. Lond. 1697, p. 87. — *Katzky* in Act. Medicor. Berol. Vol. IX. p. 61. 8vo. Berol. 1721; and *Gilibert* Adversaria med. pract. Ludg. 1791, p. 132, a true heart. There is also in the Anat. Mus. at Berlin, according to an excellent communication of *Rudolphi's*, an acephalous monster with a heart.

(2) *Marrigues* in Mém. de Mathém. prés. à l'Acad. des Sc. Vol. IV. p. 123. — *Daniel* Samml. med. Gutachten. Leipz. 1776, p. 276.—*Brodie* in Phil. Transact. 1809, p. 161; and in Edinb. med. and surg. Journ. Vol. VI. p. 191.—*Lawrence* in Med. chir. Transact. Vol. V.

(3) A heart with four auricles, and four ventricles, v. *Vetter's* Aphorismen aus der pathol. Anat. p. 108.—In a calf, there was a third smaller one near the left ventricle. *Lictzau* Hist. trium monstrorum. Regiomonti, 1825, p. 9.—In a goose, three ventricles. v. Ephem. N. C. Dec. I. Ann. IX. and X. Obs. 108; Dec. II. Ann. VIII. Obs. 114, Schol. p. 251. — *J. F. Meckel* Tab. anat. path. Fasc. I. Vol. II. fig. 1, describes a heart, from the right ventricle of which two aortæ arose. Similar cases are described by *Haller*, Opera minor. Vol. III. tab. 16.—*Walter* Observat. anat. tab. 4, fig 3 and 4.—I have also seen a similar case.

(4) *Kerkring* Spicil. anat. Obs. 69, p. 139, 642, the right ventricle double, with two pulmonary arteries.

(5) Compare several doubtful cases in *de Plouquet* Repertor. Art. Cor. duplex.—*Winslow* in Mém. de l'Acad. de Paris, 1743, p. 462.—*Coulomb* Œuvr. méd. chir. Lyon, 1798. s. *Reil's* Archiv, Vol. IV. p. 213.—*Chaussier* in Bulletin de la Facult. de Médec. de Paris, 1816; in *J. F. Meckel's* D. Archiv, Vol. II. p. 137. — In a dog. v. *Paullini* Cynograph. cur. p. 43.—In a rat. v. *Boerhaave*, p. 491.

(6) For instance, in fowls. v. Ephem. Nat. Cur. Cent. VIII. Obs. 8; and *Littre* in Mém. de Paris, 1700, p. 32.—In partridges. v. *d'Aboville* in American Philos. Transact. Vol. II. p. 330.—In pigeons. v. *Barzellotti* in Nuovo Giornale de' Letterati. Vol. I. No. 1. Pisa, 1822. — In geese. v. *Sömmerring* addenda to *Baillie*, p. 27, note 51; and *J. F. Meckel* Comm. de duplicit. monstrosa, p. 54. fol. 1815.—Ephem. Acad. Nat. Cur. Dec. I. Ann. IX and X. Obs. 108, p. 267.

§ 170.

The heart varies, not unfrequently, considerably from its usual and proportionate SIZE in both directions, not only as consequent on original formation, but also more frequently from disease; such disproportionate size of the heart to the whole body appears even to be hereditary. The irregular SMALLNESS of the heart is sometimes congenital, and is then probably connected in some cases with other vicious formations of that organ.[1] Sometimes this smallness is connected with general weakness and imperfect development;[2] although, indeed, often not distinctly marked.[3] The acquired smallness of the heart, the consequence of disease, CONSUMPTION, or ATROPHY,[4] is very different from the state just described. This vice is rarely produced by external pressure or narrowed space, *stenocardia;*[5] but is more usually caused by defective nourishment of the whole body,[6] or of the heart alone, especially after inflammation, softening, &c., and is, since the consumption takes place principally in the muscular substance of the heart, connected naturally with the more or less considerable THINNING OF THE WALLS of the heart.[7] Sometimes this smallness of the heart is only a seeming diminution, in

consequence of the violent contraction of the muscle itself, continued even after death.[8]

(1) I have found it exceedingly small in a dozen instances, in monsters, or newly-born children otherwise well-formed, together with other vices, as holes in the partition of the ventricles, closure of the venous aperture of the right ventricle, but especially in unnatural position of the heart, and in frenic ruptures; in the latter, indeed, there has been irregular pressure upon the heart. Other observers have also frequently noticed the same. Also in double monsters, in which two hearts are placed in one chest, it is not unfrequent for one of them to be remarkably small.

(2) *Kerkring* Spicil. anat. p. 43. — Mém. de l'Acad. des Sciences de Paris, 1712. — *Lieutaud*, Vol. II. p. 147, Obs. 453.—*Morgagni*, Epist. XVII. p. 12.—*Chavasse* in Lond. Med. Journ. 1786, p. 409. — *Kreysig*, Vol. II. Part II. p. 468, &c.—I have twice found in grown-up persons, and in a weakly girl, whose generative organs were almost those of a child, the heart remarkably small. v. No. 2186 and 2187 of my Verzeich.; in which, under No. 2188 and 2189, other cases of still further diminution are related.—In tame birds, the heart is proportionally less large and muscular than in wild ones of the same species. v. *Tiedemann's* Zoologie, Vol. II. p. 571.

(3) Many cases of very small hearts, in grown up persons, are loosely mentioned by *Lieutaud*, p. 146; and in *de Plouquet* Art. Cor. parvum. —In a man of fifty years it was not larger than in a child of four years. v. *Wedemeyer* in *Rust's* Magaz. f. d. ges. Heilk. Vol. XIII. p. 190.—*Biermayer* Mus. Anat. Pathol. No. 381.

(4) Compare *Testa*, § 4, No. 15.—*Kreysig*, Vol. II. Part I. p. 326. — *Vetter*, in his Aphorismen aus der pathol. Anatomie, p. 101, note, seems to consider, improperly, the small size of the heart as a congenital vice.

(5) *Brera* Della stenocardia, malattica volgarmente conosciuta sotte il nome di Angina pectoris. Verona, 1810. — I have occasionally found the heart, when it has been much confined by collection of fat in the pericardium, by hardened lungs, tumours in the mediastina, and by elevation of the diaphragm, not merely very small, but compressed as it were into an angular shape. Compare note 1.—A heart which had been diminished in size by a fatty swelling, is described by *Meckel* Mém. de l'Acad. des Sc. Berlin, 1755, p. 82.—In an uncommon collection of water in the belly, which very much compressed the heart, *Testa*, p. 255, found it extremely small. — *Kreysig*, Vol. III. p. 124, found it small in a case of lardaceous growth in the mediastina.

(6) Hence not unfrequently arises the diminution of the heart, in a small degree, in wasting diseases, although by no means so common and rapid as in other muscles, as *Morgagni*, Epist. LXX. p. 5, has observed. This arises from the want of cellular tissue between the muscular bundles.

(7) The walls of the heart are so thin, that they are merely membranous, especially when the muscular fibres are very pale. Here belong also the case of a person who died of a long-continued sickness, in whom no heart was found, but in its stead merely a membrane. v. *Telesius* De rer. nat. L. V. c. 28.—*Schenck* Observat. L. II. p. 272. — If a really small heart be fleshy, hard and red, I consider it as a vice of formation; if it be, notwithstanding, at the same time, thin and dried up, pale or hardened, I then consider it as a wasting atrophia.

(8) I have seen this repeatedly, particularly in deaths from accident, and in those who have died of tetanus; also once in a person who died suddenly from a stab in the heart.—*Testa*, p. 148, cites an interesting case, in which a man struggled uncommonly when executed, and on dissection, the heart was discovered very small, from its being most strongly contracted; therefore *Portal*, Vol. III. p. 88, and *Kreysig*, Vol. II. Part II. p. 469, very properly warn us against these easily to be avoided errors.

§ 171.

The opposite vice, or IRREGULAR ENLARGEMENT of the heart, is but rarely a congenital disease,[1] usually it is acquired,

in consequence of the mode of living, or of certain diseases, in which the heart can attain very considerably more than its usual size.[2] This enlargement appears, first, in the otherwise normal state of the heart, as the mere thickening of its walls, that is, as an increase of bulk, or HYPERTROPHY of the fleshy substance, which arises from increased excitement, in a manner analogous to other muscles;[3] and, secondly, as the MORBID EXPANSION OF THE CAVITIES OF THE HEART, *aneurysma cordis, cardieurysma, cardiectasis*, &c.[4] This latter is usually divided into the ACTIVE and the PASSIVE, the former of which consists in the expansion of the cavities of the heart, with simultaneous thickening and increased hardness of its walls; the latter in expansion of the cavities, with thinning, relaxation, and extension of the walls of the heart. The active aneurysm, which properly does not deserve the title *aneurysm*, if compared with the so-named disease of arteries, occurs most commonly on the left side, especially in the ventricle, but more rarely on the right side; the passive, on the contrary, is usually seated on the right side of the heart, and particularly in the right auricle. Both forms of aneurysm are frequently met with in the same individual, and but rarely is the whole heart affected with one or other species of the disease alone. The expansion of the cavities is naturally greater in the passive than in the active aneurysm, and the whole cavity generally participates equally in it; more rarely is one single circumscribed spot affected, which is then distended in a bag-like form, and connected with the cavity of the heart by an aperture between the ruptured or separated muscular fibres.[5]

(1) In new-born children of similar size, we sometimes find a striking difference in the size of the heart, and the whole of its blood-vessels, as it is usually larger in wide, than in narrow-chested children; often also are the hearts of new-born children affected with the blue disease, proportionably very large.

(2) Even double and more of the usual size and weight. Compare *Lieutaud*, Vol. II. p. 129—146. — *de Plouquet* Repertor. Art. Cor. magnum. — *Reuss* Repertor. Comment. Vol. X. p. 92; Vol. XII. p. 304; for instance, as large as the heart of an ox.—*Lancisius* Von den verschiedenen plötzl. Todesarten. Vol. II. p. 130.—*Morgagni* Ep. XVII. p. 21; XVIII. 28; LIII. 9. — *Wildberg* in the Abhandl. der Erlanger phys. med. Soc. I. No. 16.—Gustavus Adolphus's heart weighed 25 ounces.—Hearts of two or three pounds were found by *Chambert*, in Journ. de Méd. cont. July, 1810, p. 5.—*Fritze* in *Horn's* Archiv f. prakt. Medic. Vol. III. p. 298. — I once found a heart which weighed two pounds and ten ounces. — *Boeck* D. de statu quodam cordis abnormi. 8vo. Berol. 1818, with plates, &c.

(3) *Vetter* Aphorismen aus der pathol. Anatomie, p. 99. — *Bertin.* — *Legallois* Observation sur une maladie du cœur par hypersarcose, ou par excés de la substance musculaire, etc. in Bulletin de la Faculté de Méd. de Paris. Ann. XIII. p. 69. — Several cases of hypersarcosis of the heart are given by *Lallemand* in Archiv. générales de Médec. Aug. 1824. — *Rousseau* compares the hypertrophy of the heart in active aneurysm, with the development of the muscular substance of the uterus in pregnancy. v. Recueil de Mémoir. de Méd. Chir. et Pharm.

§ 172.

The just-mentioned partial enlargements of the heart naturally lead us to consider the VICES OF FORM in this organ. These are usually congenital, and may affect both the EXTERNAL and INTERNAL form. The former are frequently connected with the latter, and are often necessarily consequent upon them;[1] still, however, vices of the external form alone are not infrequent,[2] since, both in infants and adults, the heart has been noticed, for instance, too globular,[3] flattened,[4] very long and pointed,[5] very broad and blunt,[6] deeply indented at the tip,[7] unsymmetrical,[8] crooked,[9] with processes and deep indentations of the auricles,[10] &c. The irregular internal form and arrangement of the heart, as it depends partly on the development of the organ itself, and is merely a retardation of it, is not merely more common, but more important,[11] as the circulation of the blood is usually so irregular that the continuance of life for any length of time after birth is prevented, or at least rendered very difficult; and in both cases a morbid condition is presented by the mingling together of the arterial with the venous blood, which has been named, from its most remarkable symptom, the BLUE DISEASE, *morbus cærulens, cyanosis, cyanopathia.*[12]

(1) In the greater number of instances, the hearts of persons affected with the blue disease are also externally malformed, not to mention examples of still more imperfect formations of the heart. I have found the heart also, in a great number of such cases, most commonly too broad and blunt; for example, No. 2896, 2929, 2930, 2899, 8011, 8012, in Bresl. Mus. and in many others.—Also in many animal monsters.

(2) Sometimes the fault appears to lie in an irregular position, or narrowed space.

(3) *K. Blegny* Zodiacus Ann. II. Jan. Obs. 4.—*Köhler* Beshreib. der Loderschen Samml. No. 1037.—I found it once in a child with anencephaly and abdominal cleft, almost spheroidal, No. 8016, of the Museum.

(4) *Stalpart van der Wiel* Observat. rar. med. anat. L. B. 1687. Cent. I. Obs. 37.—*Kulmus* in Actis Lips. Ann. 1727.—I have found it likewise occasionally in dropsical people, also in a monster. v. Selt. Beob. Part I. p. 8.

(5) For instance, if the pericardium be deficient at its base, the point of the heart lies between the lobes of the liver. v. Selt. Beob. Part I. p. 64; and frequently since.—Very much elongated, in which case its apex adhered to the head.—*Cerutti* Rar. monstr. descript. anat. 4to. Lips. 1827.—Very pointed when one of the ventricles does not reach the point, &c.

(6) Not unfrequently.

(7) *Bartholinus* Histor. anat. Cent. I. Hist. 67; Vol. I. p. 117.—*J. F. Meckel* Pathol. Anat. Vol. I. p. 469.—*Kelch* Beiträge zur pathol. Anat. p. 81, No 57.—*Burkhardt* D. de monstro humano notabili. 8vo. Frib. 1825.—My Verzeichniss, No. 2201. —*A. Meckel* in *J. F. Meckel's* Archiv f. Anat. u. Physiol, 1828. No. 2, p. 153.

(8) In which case one or other ventricle is too small.

(9) *Morgagni* Epist. LX. p. 8.

(10) *de Haen* Ratio medendi. Vol. IX. p. 39. Viennæ, 1764.—*E. d'Alton* D. cyanopathiæ specie, p. 15, Bonn, 1824.

(11) The resemblance which such malformed human hearts are said to have to those of the lower animals, for example, insects, crabs, molusca, fish, and

amphibious animals, is to me not conclusive. Setting aside the number of cavities and holes in the partitions of the heart, I have never been able to discover the smallest or most remote similarity with any one heart of an animal. How different, for example, is the heart of a child affected with the blue disease with the opening insepto of the heart of a tortoise with the other form, the several auricles, the loose but at the same time spongy structure of the walls of the heart; the other valves, the pale and soft muscles, &c.? It is remarkable that this kind of vice of structure is, against all rule, more common in the male than in the female sex.

(12) *Seiler* Pr. de morbo cœruleo. Viteb. 1805.—*Schuler* D. de morbo cœruleo. 8vo. Œnipont, 1810.—*Nasse* in *Reil's* Archiv f. d. Physiol. Vol. X. p. 213.—In a supplement to the translation of *Burns* on Diseases of the heart, and a collection of twelve cases, in *Horn's*, *Nasse's*, and *Henke's* Archiv für medic. Erfahrung. Nov. and Dec. 1817.—*Kämmerer* D. de morb. cœrul. Halæ, 1811.—*J. F. Meckel* Handbuch der pathol. Anat. Vol. I. p. 419, ff.; and in D. Archiv f. d. Physiol. Vol. I. p. 221, with a table of seventy-seven separate observations.—*Tobler* D. de morbor. cœrul. Gött. 1812.—*Haase* D. de morb. cœrul. 4to. Lips. 1813, with engravings. — *Kwiatkowski* D. ætiologiam morbi cœrulei amplificans. 8vo. Vilnæ, 1815.—*Hein* D. de istis cordis deformation. quæ sanguinem venosum cum arterioso misceri permittunt, 4to. Gött. 1816, with a table of more than seventy-one cases.—*C. de Hartmannn* D. de cyanosi ejusque cura. Viennæ, 1817.—*Cherrier* D. sur la maladie bleue, etc. Paris, 1820.—*Marx* D. morbi cœrul. exemplum memorabile. 8vo. Berol. 1820.—*Zimmermann* D. de morb. cœruleo. 8vo. Berol, 1822, (without a case of his own.)—*Peters* D. s. relationem de puero, morbo cœruleo laborante. 4to. Kiliæ, 1822. — *Horner* D. de Cyanosi. 4to. Monachii, 1823.—*Louis* Observations suivies de quelques considerations sur la communication des cavités droites avec les cavités gauches du Cœur in Archiv. génér. de Médec. Nov. 1823, and in Mémoires ou Recherches anat. pathol. p. 301, Paris, 1826. (with some of his own cases.)—*Gintrac* Observations et Recherches sur la Cyanose ou maladie bleue. Paris, first as a Diss. 1814, subsequently enlarged. 8vo. 1824. (three cases of his own, and a collection of fifty-three others.)—*Ramberg* D. de corde vasisque majoribus eorundem ratione normali in animantibus et abnormi in homine, 8vo. Berol. 1824, with engravings.—*E. d'Alton* D. de cyanopathiæ specie ex invicem permutata arteriæ pulmonalis atque aortæ origine, 4to. Bonnæ, 1824, with engravings. — *Meinecke* D. de cyanosi. 8vo. Berol. 1825. — *Lewes* D. de morbo cœruleo. 8vo. Berol. 1826.—*Fr. Ermel* D. de cyanosi. 4to. Lips. 1827. — As to individual cases, v. the tables of *Meckel*, *Hain*, and *Gintrac*, the latter of which I have not unfortunately at hand. — *Gallois* Bulletin de la Faculté de Médecine de Paris, 1809, p. 133.—*Pelletan* Clinique chirurgicale, Vol. III. Paris, 1810.—*Tupper* in London Medical and Physical Journal, Vol. III. p. 497. — *Jackson*, *ib.* No. 198, p. 100, Aug. 1815; and in New-England Journ. of Med. and Surg. Vol. III. p. 161, 1814.—*Ribes* in *Corvisart* and *Leroux* Journ. de Médec. Vol. XXXIV. p. 421, 1815. — *Thomson* in Ebinb. Med. and Surg. Journ. Vol. XII. p. 3.—*Dorsey* in New-England Journ. of Med. and Surg. Vol. I. p. 69, 1812.—*Young* in Journal of Science and Arts of the Royal Institution, London, 1816, Vol. I. Art. 3, with engravings. — *Howship*, Practical Observations in Surgery and morbid Anatomy, Cases 57—59, 1816.—*Kreysig* Die Krankheiten des Herzens. Part III. p. 104, with engravings. — *R. Thoxter* in New-England Journal of Medicine and Surg. Vol. V. Boston, 1816. — *Creveld* in *Hufeland's* Journal d. pr. Heilk. p. 74. Decemb. 1816. — *Delondre* in *Sédillot's* Journ. de Médec. Vol. LX. p. 38.—*Wistar* s. Gött. gelehrte Anzeigen, p. 1767, 1818.—*Nordblad* in Ars-Berättelse om Svenska Läkare-Sällskapets Arbeten of *Carlander*. Stockh. 1816.—*Seidel* Index Musei anatom. Kiliensis. p. 61, Kiliæ, 1818.—*Marechal* in Journ. gén. de Médec. Vol. LXIX. p. 354, Dec. 1819.—*Thibert* and *Fouquier* in Bulletin de la Faculté de Médec. Vol. VI. p. 355 — *Olivry* in Journ. gén. de Medec. Vol. LXXIII. p. 145.—*Hesselbach* Bericht von der königl. anat. Anstalt zu Würzburg, 1820, and Beschreib. der pathol. Präparate zu Würzburg. p. 201. No. 541; p. 202, No. 610. Giessen, 1824. — *Nasse* Leichenöffnungen, p. 166, 1ste Reihe. 1821.—*Gregory* in Med. chir. Transact. Vol. XI. p. 296, 1821.—

Olory in Repertorio Med. chir. per l'anno 1821, Turino. — *Bock* in *Cerutti's* Pathol. anat. Museum, Vol. I. Part III. p. 37. — *Holmsted* in London med. Repository, Vol. XVII. p. 455, June, 1822.—*Schallgruber* Abhandl. im Fache der Gerichtsarzneikunde, p. 55—76. Grätz, 1823.—*Rust's* Magazin f. d. ges. Heilk. Vol. XVIII. p. 346.—*Hesse* D. Monstri bicipitis descriptio anat. p. 20. Berol. 1823.—*C. Perkins* in New-York Med. and Phys. Journ. Vol. II. p. 444.—*Holmers* in Transact. of Med. chir. Soc. of Edinb. Vol. I. No. 11. 1824.—*Tiedemann* in d. Zeitschrift f. Physiologie, Vol. I. Part I. p. 111, pl. 7, fig. g.—*Coates* in *Chapmann's* Philadelphia Journal of the Med. and Physic. Sc. Vol. IX. No. 17, Nov. 1824. — *Rosenstiel* D. monstri duplicis rarissimi descriptio anatomica. p. 12. Berol. 1824.—*Wirtensohn* Duor. monstror. duplic. humanor. descr. anat. p. 13, tab. 2. Berol. 1825.—*Hall* and *Vrolik* in Praktisch Tijdschrift voor de Geneeskonde. Part II. 1825.—*Burkart* D. de monstro humano notabili. 8vo. Friburg, 1825. — *Abercrombie* in Trans. of Med. Chir. Soc. of Edinb. Vol. I. p. 1. — *J. F. Meckel* Descript. monstr. nonnull. p. 11, 21, 31, 59. 4to. Lips. 1826. — *Breschet* in Répert. gén. d'Anat. etc. Vol. II. p. 12, 17.—*Hufeland's* Journ. d. prakt. Heilk. p. 133. Feb. 1826. — *Delmas* in Ephémér. méd. de Montpell, Vol. I. Jan. 1826.—*Ullrich* in *Rust's* Magaz. Vol. XXII. p. 502.—*Mauran* in Philadelphia Journ. Vol. XIV. p. 253. — *Dujes* in Journ. gén. de Méd. Vol. CI. p. 88.—*Mayer* in *v. Gräfe's* and *v. Walther's* Journ. der Chir. Vol. X. p. 44, pl. 2, fig. 1.—*Knup* in *Harless* Rhein-Westphäl. Jahrb. d. Med. und Chir. Vol. IV. Part I. No. 8.—One case in Archives gén. de Médecine, Sept. 1827.—*Cerutti* Rarior. monstri. descript. anat. 4to. Lips. 1827, with engravings.—*Staupa* Anweisung zu gerichtl. und pathol. Untersuchungen menschl. Leichname. p. 164, note xx. Wien, 1827. — *Cogoreux* in Revue médic. franc. et étrang. Vol. I. and II. 1827.—*Wittcke* in *Hufeland's* and *Osann's* Journ. d. prakt. Heilk, April, 1828—*R. K. Hoffmann* in New-York Med. and Phys. Journ. Vol. VI. p. 250. — *Basedow* in *Hufeland's* Journ. p. 78, July, 1828.—My Selt. Beob. Vol. I. p. 16, 64; Vol. II. No. 21, p. 49, 102; since in No. 2203—2207, 2896, 2899, 2929, 2944, my Verzeichniss, and in No. 8011—8014, 8020, besides in several monstrous cattle and sheep.—*Legallois* observed one case in a rabbit, Vol. XII. p. 122. v. Bulletin de la Soc. de Médec. 1809, p. 99.—Compare *Reil's* Archiv. B. and *Meckel's* Descript. monstror. nonnullor. p. 50, in a pig.—*R. Knox*, in Edinb. med. and surg. Journ. 1815, Vol. II. p. 57.—*Alibert* Nosologie Naturelle, 1817, Vol. I. p. 344. — *Bonnissent*, *Obet*, and *Pinel*, in Revue Médic. Vol. VI. p. 175, Oct. 1821.—*Lallemand* in Rech. anat. pathol. sur l'Encephale, Vol. II. p. 7, Paris, 1823.—*Cruveilhier* Anat. Pathol. Part I. pl. 6.

§ 173.

These MALFORMATIONS of the heart vary considerably in degree. As the lowest kind we must notice that rudimentary formation of the heart in which it appears as a mere fleshy mass without any cavity;[1] as a longish solid mass, from which the vessels arise;[2] or as a mere expanded vascular trunk.[3] To these, follow the heart with a very imperfect muscular structure, containing a single valveless cavity, with a very imperfect trace of an auricle;[4] then such hearts as are occasionally formed with but a single ventricle and auricle, with a corresponding vascular trunk,[5] succeeded by those which, having merely a single ventricle, are furnished with an auricle, more or less perfectly divided by a partition into two cavities, whence the venous and arterial trunks simultaneously arise, either confounded together or distinctly divided.[6] More perfect and more common are those formations of the heart, in

which, either by the increased capacity of the ventricle, or by the gradual development of the partition, merely open at a single point,[7] the division into two ventricles is completed,[8] of which, sometimes the right,[9] at other times the left alone,[10] is small and imperfect. Lastly, we frequently meet with those hearts which are irregular in their normal structure, merely so far as that the peculiar fœtal blood-passages remain morbidly open, so that either both the oval hole, and the arterious duct,[11] or only the former,[12] or the latter alone,[13] are found unclosed. In diving mammalia, viz. the otter, the seal-kind, the beaver, the desman, and the cetaceous animals, we find the oval hole or the arterious duct generally, though not always open, but still much more frequently than in other beasts.[14] We also occasionally meet with, in the human subject, one or more tolerably distinct apertures in the oval pit, continuing to a later period of life without any consequent diseased condition;[15] it however appears that, by no means infrequently, is the already closed oval hole again morbidly opened, and with it, as it were, a recurrence to the fœtal state.[16]

(1) Misc. Nat. Cur. Dec. II. Ann. II. Sect. 143; Dec. III. Ann. II. Sect. 9. —*Veslingii* Syntagma Anatomicum, p. 150.—In a large fat pig, with accompanying small size of the liver and spleen, the heart was found not bigger than a small cherry, attached by a thin neck in the pericardium, and without auricles and blood-vessels. v. *Fahnestock* in American Medical Recorder, Vol. VI. April, 1823.

(2) *Zagorsky* Nov. Act. Petropol, Vol. XV. p. 478. 1806.

(3) In many headless monsters.

(4) *Roederer* Fœtus parasitici descriptio in Comment. Soc. Götting. Vol. IV. p. 125.

(5) *Wilson* in Phil. Trans. 1798, Part II. p. 346.—*Farre*, p. 2.—*Mauran* and *Breschet*, p. 17.

(6) *Standert* in Phil. Trans. 1805.—*Tiedemann's* Zoologie, Vol. I. p. 177.—*Chemineau* in Mém. de l'Acad. des Sc. 1699, Hist. p. 43.—*Lawrence* in *Farre*, p. 31.—*Fleischmann*, p. 193.—*Pozzis* in *Senac.*—*Hartmann* and *Staupa.*—*Mauran.* —My Selt. Beob. Part I. p. 16.—*Wolf* in *Kreysig*, Vol. III. p. 200.—*Rosenstiel*, p. 12.—*Breschet*, p. 12.

(7) Usually we find an opening more or less large in the upper part of the partition; and over it the aorta springing out of both ventricles. In rare cases, however, is this hole further downwards towards the apex, or it is even manifold. The first instance was found by *Meckel*, v. *Reil's* Archiv. Vol. IX. p. 442, and Tab. anat. Fasc. I. tab. 1, fig. 2; *Gregory*;—and myself in a monstrous calf—the latter, *J. F. Meckel* Descriptio monstror. nonnullor, p. 11.—*Kreysig*, Vol. III. p. 104; and myself, No. 2899; in all three cases two openings; in one case even three. v. *Hodgson* in *Farre*, p. 19.

(8) Such holes in the upper part of the partition were observed by *Stenson*, *Mery*, *Sandifort*, *Hunter*, *J. F. Meckel* in three cases, *Farre* in three cases, *Langstaff*, *Ring*, *Abernethy*, *Obet*, *Prochaska*, *Meyer*, *Cooper*, *Tiedemann*, *Richerand*, *Nevin*, *Pulteney*, *Cruikshank*, *Corvisart*, *Cailliot*, *Duret*, *Huet*, *Lawrence* and *Haase*. v. *J. F. Meckel's* and *Hayn's* tables.—Further, *Pelletan*, *Tupper*, *Jackson*, *Ribes*, *Creveld*, *Thoxter*, *Dorsey*, *Delondre*, *Seidel*, *Marechal*, *Olivry*, *Hesselbach*, *Nasse*, *Gregory*, *Olory*, *Bock*, *Holmsted*, *Horner*, *Schallgruber*, *Perkins*, *Holmers*, *Burkart*, *Meckel* in six cases, *Hufeland*, *Gallois*, *Howship*, *Abercrombie*, *Louis*, Obs. 10, *Hoffmann*, *Basedow*, *Knox*, *Gintrac*, p. 164, and myself in twelve cases, viz. Selt.

Beob. Vol. I. p. 64; Vol. II. p. 50, 102.—In No. 2203—2207, 2896 (with a valve,) 2899, 2929, 8011, 8013, 8014, 8020.—In an anencephalic as well as in a calf and sheep monster.—In very rare cases such holes appear also capable of arising later through disease, for instance, in abscess, lacerations, &c.—Hereto belongs a case which I saw in the Anat. Mus. at Strasburg, and the case of *Thibert* and *Fouquier*.

(9) For example, *Marechal*, *Holmers*, *Beckhaus*, *Schuler*, *Kreysig*, Vol. III. p. 104. —My Selt. Beob. Part I. p. 64; Part II. p. 50; and in No. 8020 of the Bresl. Mus.—Hereto belongs, in a certain degree, also the case observed by *Abercrombie*, in which the upper part of the right ventricle of the heart by adhesion of its walls was separated, and produced a small cavity.

(10) This was found by *Mery*, *Meckel*, in two cases, *Corvisart*, *Farre*, in two cases, *Louis*, Obs. 4, *Ramberg*, *Rust*, and *Hesselbach*.

(11) For instance, in the cases by *Langstaff*, *Jurine*, *Spry*, *Seiler*, *Burns*, and one by *Farre*.—*Wolf* in *Kreysig*, Vol. III. p. 200.—*Marechal*.

(12) *Hodgson*, *Hunter*, *English*, *Lawrence*, *Schuler*, *Nevin*, *Haase*, *Jurine*, *Sandifort*, *Meckel*, *Tacconi*, *Morgagni*, *Nordblad*, *Farre*, in two cases *Meyer*, *Green*, *Corvisart*, *Hesselbach*, *Seiler*, *Delmas*, *Ulrich*, *Hoffmann*, *Basedow*.—*Moreau de la Sarthe* Fragmens pour servir à l'histoire de la Médecine en France, p. 45. 1812. —*Kreysig*, Vol. III. p. 104, with an engraving.—*Knox*, *Alibert*, *Gintrac*, p. 164. *Cherrier*, *Bonnissent*, *Obet*, *Pinel*, and *Lallemand*.

(13) *Fabricius Hildanus* Op. omnia. Ep. XLV. p. 992.—*Brendel* in Ephem. Nat. Cur. Cent. IV. Obs. 166.—*Hunter* and *Jurine* found it open but narrow. *English*, *Obet*, *Richerand*, *Spry*, *Seiler*, *Marechal*, *Burns*, *Thoxter* and *Delmas* saw it wider.

(14) *J. F. Meckel* has collected such cases in his edition of *Cuvier's* Comp. Anat. Vol. IV. p. 37, note; in his Beiträgen zur vergl. Anatomie, Vol. II. Part I. p. 15, and in his Pathol. Anat. Vol. I. p. 447.—*Blumenbach* Handbuch der vergl. Anatomie, p. 543.—I have hitherto found the oval hole open in three seals, and also in the alca torda in *Tiedemann's* anat. Mus.—The oval hole open in a young delphinus phocœna. v. *Eichwald* in Mém. de l'Academ. des. Sc. de Petersb. Vol. IX. p. 431.

(15) Compare *J. F. Meckel's* Pathol. Anat. Vol. I. p. 447.—We usually find the aperture obliquely upwards, sometimes downwards, and in number even as many as a dozen. In the Anat. pathol. Mus. at Vienna I saw the heart of a young man with an open oval hole, and a second also, separated from it by a thick column of flesh. Two oval holes were found by *Vieussens* Du Cœur, p. 53.—*Breschet* and *Hoffmann*.—I have very often found in adults, who had never complained of any affection of the heart, openings in the partition of the auricle of the thickness of a finger. Similar cases have been often described; compare *Reuss* Repertor. Comment. Vol. X. p. 39, and *de Plouquet* Repert. Art. Cor. and *Biel* D. de foraminis ovalis et ductus arteriosi mutationibus. 4to. Berol. 1827, with engravings.

(16) *Lentilius*, Eph. Nat. Cur. Cent. VII. VIII. Obs. 62, was the first who adopted the idea of the reopening of the oval hole. — *Tacconi*, in Comment. Bonon. leads to this from a case.—*Abernethy*, in Phil. Transact. 1798, P. I. believed that this was the case in affection of the lungs; also *Meckel*, p. 465, is not disinclined to adopt this opinion. I myself have endeavoured to ground it upon fourteen cases. v. my Selt. Beob. Part I. p. 97, and Part II. p. 53. And since then I have observed more cases which speak to that point. Also *Gintrac* and *A. Retzius*, v. Ars. Berättelse om Svenska Läkare-Sällskapets Arbeten lemnad af *Ekström* Stockh. 1826, are of this opinion.—Single obs. which appear to me to countenance it are *Schrader* Obs. an. med. Dec. I. Obs. 4, p. 65.— *Brendel*, Ephem. N. C. Cent. IV. Obs. 166.—*Sandifort*, Obs. anat. pathol. L. IV. cap. 6.—*Thomson* in Edinb. med. and surg. Journal, No. 46, Jan. 1826, No. 2.— *Thibert*, *Fouquier*, and *Young*. — *Boillaud* in Nouv. Journ. de Méd. Vol. VI. p. 23. — *Corvisart*, 2d edit. p. 290. — *Retzius*. — *Hesselbach*, p. 205, No. 620. — Compare *Pasqualini* Mémorie sulla frequente apertura del foramine ovale rinvenuta nei cadaveri dei tisici. 8vo. Roma, 1827.

§ 174.

Though several of the just described vices of formation, for instance, the open state of the oval hole, and simultaneously with it, the perforation of the ventricular partition, are often present in the same heart, we also find still other malformations of various kinds associated with them. To these belong, for instance, the IMPERFORATE STATE OF THE VENOUS ORIFICE of the right[1] or left[2] ventricle, which is of very rare occurrence; and no less rare the NARROWED OR CLOSED STATE OF THE ARTERIAL APERTURE of the left ventricle,[3] and the very common NARROWING OR PERFECT CLOSURE OF THE ARTERIAL ORIFICE of the right ventricle, viz. the origin of the pulmonary artery.[4] Very frequently also we observe, either alone or in connexion with other vicious formations, an irregular arrangement of the ARTERIES AND VEINS arising from the heart, in consequence of which, the arterial and venous blood become mixed, or the change of the latter into the former is prevented.[5] The VALVES of the heart also not unfrequently present congenital vices[6] of formation; thus for instance, the VALVE OF THE OVAL HOLE is often entirely deficient, and especially, if in persons affected with the blue disease, the aperture be very large;[7] or it is too small, and not adherent at one or more points of its edge; sometimes it is perforated, sometimes very thin, double,[8] and differing variously in position and form.[9] The EUSTACHIAN VALVE commonly, though not always, has a certain relation to the oval hole, so that it appears to be large, if in the later periods of life that aperture is found open;[10] frequently it is entirely deficient, and not merely in after life, when it is often very small, thin, perforated, and lost in net-work, and fibres, but even in young persons;[11] sometimes it is so large that it occupies the place of the deficient thebesian valve, and covers the orifice of the coronary vein; even its position varies in certain cases.[12] It has been already observed that the THEBESIAN VALVE is often wanting,[13] but it also deviates considerably in size, form, and position;[14] and is also found double and manifold.[15] The TRICUSPID[16] and BICUSPID[17] VALVES are also deficient, simultaneously with other malformations of the heart, or they are imperfectly developed and mishapen. In rare instances the SEMILUNAR VALVES, both of the aorta and of the pulmonary artery, were not found,[18] or only as a single valve.[19] And equally rare is the existence in the former[20] or in the latter[21] of only two valves; or on the contrary, both in the pulmonary artery,[22] and the aorta,[23] four, and even five[24] semilunar valves; they are also seen cleft, and of unequal size. In a single instance an unnatural valve has

been observed on the orifice of a pulmonary vein, in the left auricle of the heart.[25]

(1) *Kreysig*, Vol. III. p. 106.—Myself in a human monster, No. 8012, and in a double lamb, No. 8020 of the Bresl. Mus.

(2) My Selt. Beob. Part I. p. 16.—Respecting the morbid narrowing of this and other openings of the heart, I shall treat when I speak of the vices of texture.

(3) A case in *Corvisart*, *Rust*, *Ramberg*, &c.

(4) This was found by *Stenson*, *Langstaff*, *Chemineau*, *Hodgson*, *Hunter*, *Schulcr*, *Fleischmann*, *Farre* (several times), *Howship*, *Nevin*, *Ring*, *Abernethy*, *Cailliot*, *Obet*, *Meyer*, *Cooper*, *Haasse*, *Sandifort*, *Huet*, *Pulteney*, *Tacconi*, *Morgagni*, *Seiler*, *Schallgruber*, *Hall* and *Vrolick*, *Delmas*, *Meckel*, and myself. v. Selt. Beobacht. Part II. p. 102, and in the monsters, No. 8012 and 8020 in Bresl. Mus. This vice consists sometimes in a mere narrowing of the arteries; in other cases the opening is through an oblique partition, but only slightly perforated in the middle, through the adherent or entirely closed semilunar valve; although this is by no means always the case in the blue disease, inasmuch as the arteries of the lungs have commonly their normal width; they are even irregularly wide, as the cases of *Farre*, *Richerand*, *Lawrence*, *Corvisart*, *Meckel*, *Young*, *Hufeland*, and *Lallemand*, will show.

(5) See further down in the several blood-vessels.

(6) Of the acquired deformity of the same we shall speak further on.

(7) *Plancus*, v. *Morgagni*, Ep. XLVIII. 62.—*Delmas*, *Hodgson*, *English*, *Lawrence*, *Ulrich*, &c.

(8) *Vieussens* Du Cœur, p. 53.—There were two foramina ovalia.

(9) *Haller* Elem. Physiol. Vol. VIII. p. 379.—*Kilian* Ueber den Kreislauf des Blutes im Kinde, u. s. w. 4to. Karlsruhe, 1826.

(10) Compare *J. F. Meckel* Pathol. Anat. Vol. I. p. 455 ff.

(11) I have found this myself often, viz. in monsters, No. 8012 and 8014 of the Bresl. Mus.

(12) *Kilian*, pl. 3 and 4.

(13) *Meckel* resp. *Lindner* D. de lymphat. vasor. systemate. Halæ, 1787, p. 2.—I have missed the valvula thebesii three times, viz. in an adult and in two monsters, No. 8013 and 8014 in the Bresl. Mus.; also in the case of *D'Alton* it was wanting.—If the left upper vena cava open into the coronary vein, then the valve also is sometimes wanting. This I observed, for instance, in a monster, No. 8020 of Bresl. Mus.

(14) In such rare cases, in which the coronary vein empties itself in the left auricle, the valve very naturally cannot be in the right, but only in the left auricle.

(15) *Sömmerring* Vom Baue des menschl. Körpers, Vol. IV. p. 427.

(16) It is wanting always when the venous opening of the right ventricle is closed, and sometimes when the aorta springs up very far to the right, by which its development is retarded, and it can only partially exist, as I have myself found several times. In two cases I found it consisting of four pieces, as was also seen by *Hesselbach*. v. Beschreib. der pathol. Präparate, p. 201, No. 541.

(17) In closed ostium venosum of the left ventricle, although also without it; for example, *J. F. Meckel*, Descriptio monstror. nonnullor, p. 11. It was very deformed in the case in *Rust*.

(18) For example, *Wichert*, Descriptio monstri duplicati. 8vo. Dorpat, 1824, p. 24, 26.—*Wirtensohn* D. duorum monstror. duplic. humanor. descriptio anat. p. 24, 4to. Berol. 1825.

(19) For example, when it is closed at its origin, or sometimes only very narrow; so that in the blue disease, in the pulmonary artery commonly, instead of the three valves, there is only a membranous ring, with a narrow opening in the middle, as mentioned above, v. note 4.

(20) *Littre* in Mém de Paris, 1713, p. 22 and 29. — *Baillie*, Engravings of morbid Anat. pl. 2, fig. 5.—*J. F. Meckel* Handb. der pathol. Anat. Vol. I. p. 436, and Tab. anat. pathol. Fasc. I. tab. 1, fig. 1; and myself in three cases. v. Selt.

Beob. Part II. p. 67. In a monster, No. 2896 of my Verzeichn, and in a monstrous calf, with cleft palate, monstrously short legs, &c.

(21) *Walther* Observat. anat. p. 9, tab. 4, fig. 3.—*Sandifort* Observ. anat. pathol. Lib. I. tab. 3, fig. 4 and 5, Lib. III. tab. 4, fig. 3.—*J. F. Meckel* De corde abnorm. Vol. II. fig. 2 and 3, and Tab. anat. path. Fasc. I. tab. 2, fig. 5 and 6.—*Farre*, fig. 12.—*Palois* in Bullet. de la Soc. de Médec. de Paris, 1809, Vol. IV. p. 226.—*Cailliot*, *ib.* 1807. p. 21.—*Hesselbach* Beschreib. der pathol. Präparate, p. 201, No. 541, and myself in two monsters, No. 8011 and 8013 of Bresl. Mus.

(22) *Petschke*, v. *Haller* Coll. Disp. anat. Vol. VI. p. 774.—*Morgagni*, Epist. XXXIV. 15.—*J. F. Meckel* De cord. abnorm. tab. 2, fig. 1, and Tab. anat. path. Fasc. I. tab. 2, fig. 2—4.—*Penada* Saggio terzo d'osserv. e memor. med. anat. Padova, 1803, No. 3.

(23) *Kelch* Beiträge zur pathol. anat. p. 81, No. 58.

(24) In an aorta at first single, but very soon after divided. v. *Malacarne* Osservazione in Chirurgia, Torino, 1788, Part III. p. 119.

(25) *Kelch*, No. 59.

§ 175.

The POSITION of the heart is not unfrequently found irregular,[1] both as a congenital and as an acquired vice. The first kind presents very many variations and gradual transitions into each other, but which may generally be referred to two forms, viz. IRREGULAR POSITION WITHIN and WITHOUT THE CHEST. To the former belong, the very rare position of the heart too much to the left side,[2] next, the more usual, and in very different degrees, situation of the heart to the right side, which is not merely observed in the transposition of all the viscera of the chest,[3] but sometimes even of the heart alone;[4] next follows, the transition thereto in the direct or vertical position of the heart,[5] or its transverse position,[6] in which the point is turned, now to the right and now to the left side, and often even upwards, and the heart itself also often placed lower; finally, some instances of the too high situation of the heart, especially in connexion with imperfect development of the cavity of the chest, in reference to its longitudinal diameter, are observed. The second kind of irregular position of the heart, in which case it is situated externally to the chest, is either its partial or entire concealment in the belly,[7] or in its more or less complete prolapse, when the anterior surface of the body is deficient, *propendentia, hernia cordis*, &c.[8] In this prolapse the heart may protrude either alone,[9] or in connexion with other thoracic and abdominal viscera,[10] at the neck or in absence of the breast-bone and through congenital holes and clefts of that bone, either higher or lower upon the breast, or close under the point of the breast-bone and at the top of the belly. Should the heart in such cases be uncovered by the sacciform expanded walls of the chest or belly, but lying completely free on the exterior, it will in rare instances ADHERE to other parts of the body.[11]

(1) *Dislocatio* seu *ectopia cordis;* compare *de Plouquet* Repertor. Dislocatio cordis.—*Haller* Elem. Physiol. Vol. I. p. 303.—*Zedler* D. de situ cordis abnormi cum historia morbi singularis huc spectante. 4to. Vratisl. 1817. — *Breschet* Mémoire sur l'ectopie de l'appareil de la circulation et particulièrement sur celle du cœur. 4to. Paris, 1826, with three plates; and in Répertoire général d'Anat. et de Physiol. patholog. &c. Vol. II. p. 1.

(2) In congenital frenic ruptures on the right side, of which I have found two examples, viz. No. 2874 and 8015 of the Bresl. Mus.

(3) Compare above, § 25, and below, on the cavity of the chest.

(4) *Reuss* Repertor. Comment. Vol. X. p. 90 and 91. We here also find different degrees, in so far as sometimes the point or the whole heart is turned towards the right, and sometimes turned completely to the right side. Examples hereof are given by *Riolanus* Anthropographia, L. III. cap. 12. — *Bartholinus* Histor. anat. 1747, Cent. II. Hist. 25. — *Fr. Hoffmann* D. Cardianastrophe admiranda, etc. Lips. 1761.—*van Doebeln* in Act. Acad. N. C. Vol. IV. Obs. 132, p. 505. — *Buxtorf* in Act. Helvet. Vol. VII. p. 101. — *Mery*, v. *du Hamel* Hist. acad. reg. Scient. L. III. c. 2.—*Walter* in Nouv. Mémoir. de l'Acad. des Sc. de Berlin, 1775, p. 139.—Abhandl. der Josephsakademie, Vol. I. p. 286.—*Delamare* in Journ. de Médec. Vol. XXXIII. p. 510.—*Tantini* Wissenschaftl. Werke. Pisa, 1812.—*Barton* in American medic. Recorder. Vol. IV. No. 2. Philadelphia, 1821. —I have found three instances. v. Selt. Beob. Part I. p. 95; Part II. p. 47; and Verzeichness der anat. Präparatensammlung, No. 2186—*Breschet*, p. 10, pl. 1, found this four times; the heart, in congenital ruptures of the diaphragm, is commonly forced to the right side by the pressure of the protruded bowels; also, in the blue disease, the heart lies sometimes on the right side. v. *Testa*, *Haase*, *Seidel*, and § 172, note 11.—*Breschet*, p. 12.

(5) *Sandifort* Obs. anat. pathol. L. IV. cap. 6, p. 55. — My Selt. Beob. Part I. p. 16.—*d'Alton* De de cyanopathiæ specie, etc. 4to. Bonnæ, 1824.—*Breschet*, p. 17.

(6) Acta Nat. Cur. Vol. X. p. 17. — Abhandlungen der Josephsakademie, Vol. I. p. 265.—*Caillot.* — *J. F. Meckel* Archiv f. Anat. u. Physiol. 1826, No. 1, p. 41.—My Selt. Beob. Part II. p. 48, in a monster, No. 8013 of Bresl. Mus., on account of depression from umbilical rupture.—*Torres* found the heart with the point turned somewhat upwards. v. Mém. de Mathém. et de Phys. Vol. I. p. 136; and in Phil. Transact. 1741, p. 776.

(7) Miscell. Nat. Cur. Dec. II. Ann. VI. Obs. 232; Ann. VIII. Obs. 114.—*Bartholinus* Hist. Anat. 1747, Cent. III. Hist. 32.—*Boerhaave*, v. Samml. auserl. Abhandl. Vol. IX. p. 491, in a rat. — *Ramel* in Journ. de Médec. Vol. XLIX. 1778, May, p. 423.—*Deschamp* in Journ. gén. de Méd. Vol. XXVI. p. 276, in the region of the left kidney.—*Vetter* Aphorismen aus der pathol. Anat. p. 108, note.—*Voigtel* Fragmenta sem. obstetr. Hal. 1792, p. 77, tab. 5. — *Lenhosseck* in Oestr. medic. Jahrb. Vol. VI. Part II.

(8) Also *ectopia cordis* in a strict sense; for instance, in *Fleischmann* De vitiis congenitis circa thoracem et abdomen. 4to. Erlangæ, 1810. — *C. Weese* D. de cordis ectopia. Berol. 1818, with six engravings.—*H. J. Haan* D. de ectopia cordis casu illustrata. 4to. Bonnæ, 1825, with two lithogr. plates.—Compare on this kind of false position of the heart, *J. F. Meckel* Handb. der pathol. Anat. Vol. I. p. 97, ff.

(9) Acta Hafn. Vol. I. No. 110.—Eph. N. C. Ann. VI. and VII. Obs. 232.—Philos. Transact. No. 461. — *Martinez* Observatio rara de corde in monstroso infantulo, etc. Madriti, 1723. v. *Haller* Disput. anat. select. Vol. II. p. 973.—*Morand* in Mém. de l'Acad. des. Sc. 1760. Hist. p. 47.—*Büttner* Anat. Anmerk. 4to. Königsberg, 1752, with engravings, in a child born alive, with the heart prolapsed; and Anat. Wahrnehmungen. Königsb. 1768, p. 36, with plates.—*Sandifort* in Act. Helvet. Vol. VII. p. 59.—*Vaubonnais* Mém. de l'Acad. des Sc. 1712. Hist. p. 89. — *Weber*, or especially *Mauchart*, v. *Baldinger's* Magazin f. Aerzte, 1776, Part VI. p. 510. — *Gilibert* Adversaria med. pract. Lugd. 1791, p. 132. — *Prochaska* Adnot. academ. Fasc. III. p. 172. — *Malacarne* in Lezioni academiche. II. VIII. p. 12. Fasc. III. V.—*Chaussier* Note sur une hernie congeniale du Cœur, in Bulletin de la Faculté de méd. de Paris, 1814, p. 93. — *Herold* in *Stark's* Archiv f. die Geburtshülfe. Vol. I. Part 1. p. 37.—*Haan* Medic.

Jahrb. des östr. Staates. Vol. V. Part II. p. 68. — *Cerutti* Rarioris monstri, in museo anatomico Lipsiensi adversati descriptio anat. 4to. Lips. 1827, with two engravings. v. *Meckel's* Archiv f. Anat. und Phys. 1828, No. 2, p. 192. — *Mende* in Nov. Act. phys. med. Acad. cæs. L. C. Vol. XI. Part II. p. 445, tab. 53, fig. 2, in a fœtus six or seven weeks old; also, though rarely in animals, viz. in dogs and calves. v. Journ. des Savans, 1668, No. 3, 1681 and 166, in two cats. v. *Regis* Journ. des Savans, 1681, p. 166. Paris.—In a sheep on the neck, v. *Weese*, p. 8, tab. 1; as a transition to this malformation is to be attributed the very loose position of the heart in deficient breast-bone, with undivided common integument. — Cordis situs patulus, in *Fleischmann*, p. 15. Compare § 137.—*Lund* Schwedische Abhandl. Vol. XXIV. p. 248.—The same in a dove, *de la Chevalleraye*. v. Mém. de l'Acad. des Sc. 1740, p. 586 and 595.

(10) Compare below, on thoracic and abdominal clefts. — In large congenital ventral ruptures, which often include the under part of the chest, we frequently find the heart then situated in the upper part of the sack, in the scrobiculus cordis above the diaphragm; but if the diaphragm be imperfectly developed, and in rare cases, even when it is properly formed, we find the heart in the belly itself, and mostly in the neighbourhood of the liver. Instances of this kind are found in *Chabelard* Mém. de l'Acad. des Sc. 1746, Hist. p. 67.—*Wahlbom* in Abhandl. der k. schwed. Acad. der Wissensch. 1767, Vol. XXVI. p. 82. — *Sandifort* in Act. Helvet. Vol. VII. p. 86.—*Büttner* Anat. Wahrnehmungen, p. 121. —*Wilson*, in Philos. Transact. 1798, Part II. p. 346.—*Voigtel* Fragm. semiol. obstetr. Halæ, 1792, tab. 5, p. 77; compare *J. F. Meckel* De cord. condit. abnorm. p. 6.—*Fleischmann*, p. 2, 17, 24, tab. 1, fig. 1. — *Bock* in *Cerutti's* Pathol. anat. Mus. Vol. I. Part III. p. 37, pl. 16 and 17. Leipz. 1822.—*Herrmann* in Salzb. med. chir. Zeitung, 1822, Vol. IV. p. 95.—*Lenhosseck* in Medic. Jahrb. des. k. östr. Staates, Vol. VI. Part II.—My Selt. Beob. Part I. p. 64.—Verzeichn. No. 2883 and 8016 of Bresl. Mus.—Also once in a monstrous calf.—In two instances it was found by *Cerutti*. v. *Weese*, p. 40, § 60.—The division of ectopia into pectoralis and ventralis, to which *Breschet* adds cephalica, appears to me by no means applicable, as all these forms gradually run into each other; at all events, we must then assume an e. collaris of which a case is described by *Lachmund*, in Ephem. N. C. Dec. I. Ann. III. Obs. 103, p. 166; that of *von Hammer*, v. Commerc. lit. Noric. 1737, Hebd. X. p. 74, tab. 1, fig. 1. — One in a sheep. v. *Weese*, p. 8, pl. 1.—And a case by *Breschet*, p. 44, in which the heart was raised upon the front of the neck, from the ramus of the lower jaw to the tongue, with which it was connected.

(11) For example, by a thick plastic thread with the navel-string. v. *Haan*, fig. 1.—With the spine on the palate, &c. v. *Breschet*, p. 45, pl. 2.—With the fore part of the face. v. *Bonfils* and *Breschet*, p. 48, pl. 3.

§ 176.

So again the heart may be irregularly situated AFTER BIRTH, and at every period of life, from causes originating either in itself or in the parts by which it is surrounded. To the former belong an unusual general enlargement or partial swelling of the heart, in consequence of which it is, as it were, dragged down out of its natural place; and the accompanying increased weight, whereby, if at the same time the parts supporting it are weakened, the heart sinks down in a remarkable manner, and carries with it the diaphragm in a bottle-like form; this sinking down of the heart has been called its PROLAPSE, *prolapsus*.[1] Large tumours lying on the upper part of the heart, especially aneurysms of the aortic arch, may also depress it.[2] The heart is also commonly displaced in other vices occurring

in the chest; to these belong, curvatures of the spine, of the ribs, and breast-bone, large tumours connected with increased consistence of the lungs,[3] collections of water,[4] plastic lymph, and pus,[5] blood,[6] and even air[7] in one of the pleuræ, in consequence of which the heart is gradually thrust in the opposite direction; again, all kinds of tumours, as large exostoses,[8] aneurysms,[9] adipose and sarcomatous swellings,[10] &c. and also from the intestines of the belly rising up into the chest through rupture of the diaphragm.[11] Finally, also, the heart may be thrust upwards into the neck, and in various other directions, by pressure of the abdominal viscera; large dropsies of the belly, tumours of the liver, spleen, of the stomach and other organs,[12] sometimes produce the same effect.[12*]

(1) *Lancisi* De aneurysmatibus, L. II. Propos. 52, p. 81; and De mortibus subitaneis, p. 136. — *Morgagni* Epist. anat. XV. note 53; and De sed. et caus. morb. Epist. XVII. p. 25—28. — *Leidenfrost* Exercit. de hernia et prolapsu cordis humani. Duisb. 1778; and Opusc. phys. chem. et med. Lemgo, 1797, Vol. I. p. 3.—*Testa*, p. 174. — Single observations in *Pachioni* Op. Edit. 4to. —*Fel. Plater* Observat. L. III. p. 636.—*Senac* Traité du Cœur. L. IV. Ch. VIII. No. 4, p. 178.—*Zuliani* De quibusdam cordis adfect. Obs. 2—4.

(2) *Morgagni* De sed. et caus. morbor. Ep. XVII. p. 25. — I have observed this twice.

(3) I have found this several times;—in one case, where a very large hard cartilaginous bag, surrounding a vomica, existed in the left lung, the heart beat for upwards of a year only on the right side, and lay there also, as seen on dissection. Compare my Selt. Beob. I. p. 95; II. p. 18.—*Senac*, L. IV. Ch. IX. § 7, p. 429.—Acta med. Berol. Dec. I. Vol. VII. p. 98. — *Schmidt*, v. *Hufeland's* Journ. Vol. XXV. p. 189.—*E. Jäger* D. de hepatitide et phthisi, etc.,—in viro, cui cor in dextro latere pulsabat. Tubing. 1780. — *Schwarz* Præs. *Mai* D. paradoxum asthma cum corde e situ naturali deturbato. 4to. Heidelb. 1803.—*Abercrombie*, in Transact. of the med. chir. Soc. of Edinb. 1824, Vol. I. two cases.—Also from emphysema of the lungs. v. *Laennec* De l'auscultation médiate. Vol. II. p. 336, Paris, 1810.

(4) *Harless* and *Ritter's* N. Journ. d. ausländ. med. chir. Lit. Vol. VI. p. 148.—A watery bag containing fifteen pints. v. Sammlung für pract. Aerzte, B. XXIII. p. 538.

(5) Most frequently is the heart pressed to the right side by a large collection of puriform plastic lymph in the left pleura.—*Klinz* in Abhandlungen der Josephsakademie, Vol. I. p. 273. — *Sömmerring* De morb. vasor. lymphaticor. p. 139. — *Friese* Archiv der pract. Heilk. f. Schlesien, Vol. III. Part III. No. 6.—*Larrey* Mém. de Chir. Milit. &c. Paris, 1812.—*Rust's* Magazin. Vol. V. p. 165.—*Zedler.*—*Howship*, Practical observations, Case 64.—*Ficker* in *Harless* Rhein. Jahrb. f. Med. und Chir. Vol. IV. p. 34.—I have seen this several times.

(6) From a bag filled with blood. v. *Plenciz* Acta et Observ. Med. p. 162.

(7) *Laennec.*

(8) Compare above, § 136, note 31; and § 137, note 21 and 22.

(9) *Werdermann* in *Mursinna's* N. Journ. f. d. Chir. Vol. I. p. 188.—I observed a similar case in an old woman, with very large aneurysm of the aorta, close to the diaphragm, by which the heart and left lung were thrust upwards and to the right.

(10) For instance, *Boerhaave* Opera omnia. Hagæ Com. 1738, p. 3.—*Meckel* in Mém. de l'Acad. de Berlin, 1759, p. 44, 45, and 86. — *Ib.* De conditione cord. abnorm. p. 6. —*Corden*, in Mem. of the Med. Soc. of London, Vol. VI. p. 122.—*Mac* in *Hufeland's* Journ. Vol. XIX. Part I. p. 112.—*Horn*, N. Archiv f. medicin. Erfahrung, Vol. III. Part I. No. 3.—*Corvisart* in *Leroux* Journ. de Médec. cont. Vol. II. p. 14.—*Lallemend* in *Ib.* p. 24.

(11) Very common in congenital frenic hernia, very rare when occurring subsequently; for instance, after a sword wound, through which the stomach was thrust up into the left cavity of the chest. v. *Sennert* Practica, L. II. Part II. cap. 15, p. 703. Lugd. Bat. 1650.—*Möbius* Fundam. med. Physiol. C. X.

(12) Even the ovaria. v. *Kelch* in *Hufeland's* Journ. d. pr. Heilk. Vol. XXV. I have twice seen it thrust obliquely upwards by large hydatid cysts in the belly. It is well known that *Brera* believed that angina pectoris arose from the heart being thrust out of its place by swelling of the liver. v. *Brera* Della Stenocardia, malattia volgarmente conosciuta sotto il nome di angina pectoris. Verona, 1810; and in Giornale di medicina practica, 1814, p. 1—26. — *Jos. Averandi* D. de angina pectoris, ejusque præcipua specie, Stenocardia, *ib.* January, 1816.

(12*) [*W. Stokes*, in Med. Gazette, Vol. VIII. p. 560, mentions a case, in which the heart was thrust (by the blow of a water-wheel) from its natural position on the left, to the right side, between the sixth and seventh ribs, on which side it pulsates. The patient still lives, but the narrator of the case has no doubt of the fact. T.]

§ 177.

Sometimes also the COLOUR of the heart is irregular; this is very commonly the case in cachetic and especially in dropsical persons; and it is not PALE merely on the external surface, but also in the muscular substance itself; a similar lighter or darker YELLOW colour is seen in fat hearts; in hypertrophy as well as in inflammation the heart is coloured too RED; hearts which are affected with softening, suppuration, mortification, or other vice of texture, are spotted sometimes GREY, LIGHT, or DARK-BROWN, and even BLACKISH. One or more WHITE SPECKS of different degrees of size are frequently observed on the heart; they are produced by a trifling degree of inflammation, which causes thickening and opacity of the membrane of the heart, and are more commonly present on the right than on the left ventricle, and on the auricle;[1] PETECHIÆ have also been noticed on the heart.[2] In a very few instances the surface of the heart itself is also reddened throughout, by the transudation of the blood;[3] and lastly, I have once seen it tinged with GREEN in a case of poison.[4]

(1) *Morgagni*, Epist. III. p. 26.—*Baillie's* Morbid Anatomy, p. 20.—I have occasionally seen them also on the auricles, on the left ventricle, and even on the venæ cavæ, so far as they are in the pericardium.

(2) *Stoll's* Ratio medendi. — *Fairbairn*, in Transact. of the med. chir. Soc. of Edinb. Vol. II. p. 157, found, in one case of purpura hæmorrhagica, effusions of blood under the inner coat of the heart, and in the muscular substance; a similar case I observed in a person who died of the febris petechialis. — I also found it in a person killed by fire-damp; and in a child which died of the whooping-cough; also in one case in violent inflammation of the heart, on insulated places, under its outer membrane, there were small extravasations of blood.

(3) Compare § 36.—*Laennec* De l'auscultation médiate, Vol. II. p. 353.—And I found this often, without suspicion of inflammation. Sometimes also even the coagulated blood transudes from the right auricle through its parietes, and colours them throughout of a brown red colour.

(4) I found this once in a child poisoned by stramonium seeds.

§ 178.

No less does the CONSISTENCE of the heart vary considerably in consequence of vice of texture. But it is also not unfrequently unnaturally relaxed, soft and easily broken down,[1] without any distinct vice of structure, but merely consequent on atrophy or some unknown proportion of composition; so also very fat hearts are always flabby and soft; violent exertion appears, as in other muscles, to render the heart easily broken down; thus, for instance, it is found very weak in hunted deer.[2] The opposite vice, or abnormal firmness of the heart, though we do not here include inflammatory hardening, is most common in hypertrophy of the heart; it is also sometimes merely a seeming hardening, in consequence of the muscles of the heart having become unusually contracted in death.

(1) In persons who have died suddenly, and without any distinct cause, we sometimes find the heart very lax and bloodless. v. *Chevalier* in Med. Chir. Trans. Vol. I. p. 157.

(2) According to *Senac.* Compare § 159.

§ 179.

RUPTURE OF THE HEART, *ruptura cordis, cardiorrhexis,*[1] is usually the consequence of the already described diminished consistence of this organ; as also ulcerative erosion, great aneurysmal expansion with thinning of the walls, and obstruction of the flow of blood through the openings of the heart or of the neighbouring large vessels. Not unfrequently, however, we observe in apparently healthy hearts, bursting in consequence of superabundant influx of blood,[2] violent emotions and external violence, not penetrating but merely producing concussion. Most frequently the left ventricle is found torn, the right[3] less so, and the auricles least of all; in some instances also, we observe numerous cracks at the same time or only rupture of the septum,[4] of some of the fleshy columns and tendons,[5] but principally of the valves of the heart.[6] WOUNDS of the heart which arise not merely from penetrating incisions, stabs, and gunshots, but also from splinters of fractured breast-bone and ribs,[7] are indeed, if they be considerable and pierce the cavities, usually immediately fatal; still they are sometimes also fatal after a longer time;[8] they, however, occasionally heal, so that subsequently we observe the scars of the wounds.[9] That such scars, however, can also be produced by ulcers which have healed, and hydatids[10] which have been destroyed, is self-evident.

(1) *Salzmann* D. de subitanea morte a sanguine in pericardium effuso. Argentor. 1731, in *Haller's* Coll. Diss. pr. Vol. II. No. 67.—*Mummssen* D. de corde rupto. Lips. 1764, with engravings.—*Murray* resp. *Tengmalm* D. de corde rupto. 4to

Upsal. 1788.—*A. Olmi* Memoria di una morte repentina, cagionata della rottura del cuore. 8vo. Firenze, 1803.—*Pohl* De ruptura cordis. 4to. Lips. 1808, with engravings.—*Brera* Di una straordinaria rottura di cuore. Verona, 1808.—*Rostan* Mémoire sur les ruptures du cœur, in Journ. gén. de Médec. p. 72, July 1820. —As to single observations, v. *Reuss* Repertor. Comment. Vol. XIV. p. 384.—*de Plouquet* Repert. Art. Cor ruptum. Dictionn. des Sc. médical. Vol. XLIX. p. 212.—*Chavasse* in London Med. Journ. 1786, Part III.—*Buchholz* Beiträge zur gerichtlichen Arzneigelahrtheit, Vol. III. p. 192, (a tear in the right ventricle of an apoplectic person.)—*Ferrus*, *Laennec*, *Blaud*, *L.* and *J. A. Rochoux.* v. *Breschet* in Répertoire général, Vol. III. Part II. p. 203.—Three instances in *Testa*, p. 391.—Salzburger Med. chir. Zeitung, 1814, No. 40, p. 239, (from an ulcer.)—*Mott* in Transact. of the Phys. Med. Soc. of New-York, Vol. I. 1817, (as a consequence of ulceration.)—*Asdrubali* in Nuovi commentarj di Med. et di Chir. Padova, 1818, (in one case.)—*Akermann* in Svenska Läkare-Sällskapets Handlingar, 1818. Vol. V. p. 221, (a gangrenous spot.)—*Betulin*, *ib.* p. 225, (after ulceration.) — Petersb. vermischte Abhandl. aus dem Geb. der Heilk 1821. Erste Samml. p. 231, (the brother of this man died in a similar way.)—*Rudolphi* Physiologie, Vol. I. p. 90.—*Ashburner*, v. *von Froriep's* Notizen, 1823, No. 82, p. 253, (both ventricles.)—Nouv. Biblioth. Med. Vol. I. No. 3, p. 1823, (both ventricles.)—Archives générales de Médec. Vol. IV. Part IV. 1824.—*Bayle* in Revue médicale, July, 1824, (the diseased person died after fourteen hours.)—*Carrier* and *Baron* in Journ. compl. du Dict. des Sc. med. Oct. 1824. —Edinb. med. chir. Transact. v. *Horn's* Archiv, Jan. and Feb. 1824, p. 143, (with suppuration.)—*Hesselbach* Beschreibung der pathol. Präparate, u. s. w. p. 321, No. 369.—*Thomas* in London Med. and Phys. Journ. Vol. LIII. p. 193, March, 1825, (the right ventricle in a boy of fourteen years old, with erosion.)—*Ziehl* in *Harless* Rhein. Westp. Jahrb. Vol. III. Part III. p. 9, (on the right ventricle.)—*Charpentier* in Journ. gén. de Méd. May, 1826.—*Berard* D. sur plusieurs points d'anatomie pathologique, No. 2, Paris, 1826, (from a fall.) — *Abercrombie* in Transactions of the Med. Chir. Soc. of Edinb. 1824, Vol. I. (two cases.)—*Zechinelli* in *Omodei* Annali universali di Medicina, Vol. XXXVII. Feb. 1826. —Myself in four cases, v. Selt. Beob. Part II. p. 59, and Verzeichniss, No. 2245 and 2246.—More recently, two instances are mentioned in the account of morbid examinations of the Bresl. Med. Coll. in one of which there was a burst aneurysm of the left auricle in a girl of fourteen.—[*Bignardi*, Rupture of the left ventricle, the substance of the heart about the aperture soft. v. Annali Univers. di Medic. Jan. 1829. T.]

(2) For instance, in the plague. *Quesnai* des fièvres, Vol. II. p. 448, and Traité des causes, des accidens et de la cure de la peste. Vol. I. p. 201. — In epileptic cases, v. *Johnston* Med. Bermerk. und Untersuchungen, Vol. II. p. 201.—Several in anger and trouble, viz. Philip V. on hearing of the loss of the battle of Placenza. — *Zimmermann* von der Erfahrung, Vol. II. p. 449.—Sometimes during coitus. v. *Morgagni*, Ep. XXVI. p. 13, and *Vater* De mortis subitaneæ non vulgaris caussis et remediis, Viteb. 1723, and in Misc. Nat. Cur. Dec. III. Ann. IX. Obs. 164. — In straining on going to stool, George II. of England. v. *Nicholls* in Philos. Transact. Vol. II. Part I, p. 265.—In hydrophobia in a pig, in the veterinary school at Alfort.—Compare *Rudolphi* Bemerk. auf einer reise, u. s. w. Vol. II. p. 62.

(3) This does not occur in those cases in which the heart is burst from external violence, as the right ventricle is then more commonly torn, on account of its being more exposed and more easily struck.

(4) Breslauer Sammlungen, May, 1723, p. 560.

(5) *Marat* in Journ. de Médec. continué, Vol. VI. p. 587.—*Corvisart*, p. 257. —*Adams* in Dublin Hospital Reports and Communications, Vol. IV. 1827, No. 19.—[*Andral*, Précis, &c. Vol. II. p. 305, speaks of perforations in the muscular substance of the heart, by which the blood is brought in direct contact with the close portion of the pericardium without rupture of that membrane, and mentions a case at the Acad. Roy. de Médec. in which the posterior part of the left ventricle exhibits five such perforations without any surrounding softening.—*Bouillaud* mentions rupture of the fleshy columns of the tricuspid

valve in a phthisical girl who had severe attacks of coughing. v. *Andral* Précis, &c. Vol. II. p. 307. T.]

(6) Compare *Haller* Elem. Physiol. I. p. 339.—*Mummssen*, p. 37.—*Sandifort* Obs. anat. pathol. L. I. c. I. p. 24 and 53.—*Meckel* in Mém. de l'Acad. des Sc. de Berlin, 1755. — *Baillie*, Morbid Anatomy, p. 32, and an engraving of it at pl. 2, fig. 5. — In an asthmatic person I once saw the tricuspid valve with a hole in it; once also one of the semilunar valves of the pulmonary artery obliquely cleft and jagged in its upper edge. The flask-like expansions which, in some instances, we observe in some of the valves, very much dispose to such tearings. —*Morand*, Hist. de l'Acad. Roy. des Sc. 1729, Obs. Anat. 7, found one of the mitral valves so distended.—[In Mus. St. Thomas's Hospital there is a case of this flask-like protrusion of the mitral valve into the left auricle, in which there are three small holes.—Rupture of the tricuspid valve in violent exertion is mentioned by *A. Williams*, Med. Gaz. Vol. IV. p. 78. T.]

(7) I have found several cases of this kind in the account of the morbid examinations of the Breslau Medicinal College; but very recently I saw in a man of Ems, who was murdered at Tillendorf, with fracture of the breast-bone and some of the ribs, the right auricle torn by a splinter of the breast-bone.— In a horse. v. *Rohlwes* Magaz. f. d. Thierarzneikunde, Vol. I. p. 311.

(8) Many cases are collected in *de Plouquet* Repert. Art. Cordis vulnus. — *Krügelstein* Promptuarium medicinæ forensis. Erfurth and Gotha, 1822, Art. Cordis vulnus.—*Alleweireldt* D. sur les lésions mécaniques du cœur et des vaisseaux sanguins, &c. 4to. Paris, 1814.—*Alphonse Sanson* Thèse: Plaies du cœur. Paris, 1827.—[Gunshot wound of the right ventricle; the boy lived two months and six days; three shot were found in the cavity of the ventricle, and the right lung nearly destroyed. v. *Randall* in Western Journal of Med. and Phys. Sc.— Left ventricle stabbed with a knife; patient lived ten days. v. Journ. hebdom, 1828. — In Mus. St. Thomas's Hospital, bayonet wound of left ventricle; patient died in forty-nine hours.—*Dapuy*, in Journal de Méd. Vétérin, 1826, p. 24, mentions a wound of the right ventricle of the heart of an ox, in which a piece of iron wire it had swallowed ulcerated through the honeycomb stomach, diaphragm, pericardium, and into the substance of the heart itself; it died in fourteen days. T.]

(9) *Ido Wolf* Observ. Med. Chir. L. I. No. 21. p. 70.—*Durande* Mém. sur l'abus de l'ensévelissement des morts, p. 28, Strasb. 1780.—*Rougnon* Considerationes pathologico semioticæ, &c. p. 7. Vesunt. 1786.—*Meier* in *Baldinger's* Neuem Magaz. Vol. IV. p. 109.—*Ollenrot* in *Schmucker's* Vermischten Schriften Vol. II. p. 127.—*Penada* Saggi di Padova, Vol. III. Part II. p. 59.—*Lentin's* Beiträge. Suppl. B. Leipzig, 1808.—*Maussion* v. Dict. des Sc. méd. Vol. IV. p. 216.—*Bougon*, v. *Rust* and *Casper's* Krit. Repertor. f. d. ges. Heilk. Vol. VI. Par. III. p. 474.—*Moglin* in Revue Méd. franc. et étrang. Vol. XI. p. 133.— Two instances in *A. Sanson.*—*Suringar* D. de Gallorum chirurgia observationum Sylloge, L. B. 1827. — Scars have also been found several times on the hearts of animals.

(10) *Morgagni* Epist. XXXVIII. 43.—He also saw it in a hare.

§ 180.

Inflammation, with its consequences, must be mentioned first among the VICES OF TEXTURE in the heart. INFLAMMATION, *inflammatio cordis, carditis*,[1] is not at all an unfrequent disease of the heart in men[2] and animals[3], as the consequence of mechanical influences, of cold, of metastases, of gout and rheumatism, of eruptive diseases,[4] of canine madness,[5] &c., and occurs sometimes in the heart alone, but more frequently simultaneous with that of the pericardium and pleura, and may be even epidemic.[6] Oftentimes we observe but a single spot of

the heart inflamed, more frequently the external membrane alone is rose-coloured, or the muscular substance, is more or less similarly affected,[7] but in rarer cases only the internal membrane lining the cavities of the heart[8] is affected. Should the inflammation of the heart be merely superficial, there is but an imperfect pouring out of serum and coagulated lymph in a slight degree, and to little extent, beneath the membrane,[9] hence, consequently, arise the above-mentioned white spots; but in higher degrees of inflammation there is a very decided effusion of a similar substance upon the surface, and even in the cavities of the heart. This effused fibrous matter renders the surface of the heart both wrinkled and uneven,[10] with little projections and knots, more frequently with fibres and net-work of various form, *cor villosum*,[11] or it is produced more largely and more smoothly, so that the heart and pericardium are lined with a false membrane,[12] of a cellular texture filled with serum, the mass occupying the interspace between the heart and the pericardium; or, finally, there is a more or less extensive and firm adhesion between these two parts.[13] Should the effusion of fibrous matter occur upon the internal surface of the heart, it appears capable of producing in very rare cases POLYPOUS COAGULA,[14] also FALSE MEMBRANES,[15] ADHESIONS OF THE WALLS OF THE HEART[16] and of the VALVES[17] to each other, and to themselves.

(1) *de Berger* D. de inflammatione cordis. Viteb. 1717.—*Gloger* D. de inflam. cordis vera. Jenæ, 1758.—*Nunn* D. de carditide spontanea. 4to. Erford, 1788. — *Metzger* resp. *Merzfeldt* D. de carditide. Regiomonti, 1789. — *Davis*, Inquiry into the symptoms and treatment of Carditis. London, 1808.—*Reikem* in Bulletin de la Fac. de Médec. p. 140. Paris, 1809. — *Burrow* D. de carditide acuta. Edinb. 1816.—*G. L. Hertzberg* De carditide, Parts I. and II. Halæ, 1817.—*Heim* Von der hitzigen idiopathischen Herzentzündung in *Rust's* Magaz. f. d. ges. Heilk. Vol. VI. p. 343, with one engraving. — *Roux* Collectanea quædam de carditide exsudativa. 4to. Lips. 1819, with engravings.—Also under the title Comment. pathol. anat. de card. exsud. 4to. Lips. 1820, with col. engrav.—*C. U. J. Huber* D. de carditide, quæ epidemice grassavit (!) inter milites anno 1814, in obsidione castelli Delfzyl, etc. 8vo. Gröning. 1819, with engravings.—Compare *Harless* Rhein. Jahrb. f. Med. und Chir. Vol. VI. p. 1.—*Puchelt* De carditide infantum Comment. 8vo. Lips. 1824.—*Glas* Ueber Herzentzündung. Inaugural dissertation. 8vo. Wurzburg, 1826.—*Krause* D. de carditide idiopathica acuta. 8vo. Berol. 1826.—An interesting case of inflammation of the heart, proved by dissection, is given by *Gairdner* in Transact. of the Med. chir. Soc. of Edinb. Vol. II. p. 237. — *Stiebel* Monographiæ carditidis et pericarditidis acutæ epistola dedicatoria et præfatio. 4to. Francof. ad Moen, 1828. — Compare above. § 165, note 1.

(2) *Marcus* Entwurf einer speciellen Therapie, Vol. II. § 1273, ff.—I find traces of inflammation of the heart not uncommon here (Breslau) especially among the poorer inhabitants, and in phthisical persons.

(3) Especially in horses and dogs; I but lately lost a Newfoundland dog with this disease; in monkeys also I have observed inflammation of the heart occurring with peripneumony.

(4) *Tanchou* On smallpox. v. Edinb. Journ. of Med. Science, July, 1826.—

Forlani Observat. Dec. No. 5, in repressed itch. I have found it in a child which died of scarlet fever.

(5) Compare *Sprengel* in *Testa*, p. 246, note 37.

(6) *Trecourt* in Recueil période. d'observations de Méd. de chir. et de Pharm. Paris, 1755, Vol. III. p. 458.—*Huxham* Op. phys. med. Lips. 1764, Vol. III. p. 50—52.—*Huber.*

(7) I have sometimes found the muscular substance inflamed an inch deep in the greater part of both ventricles, and on their outer surface.

(8) I have noticed this a few times; *Vetter* also saw it. v. Aphorismen aus der pathol. Anat. p. 98, § 109.—*Orfila*, after poisoning with white oxyd of arsenic, v. Archives générales de Méd. Feb. 1823.—*Tanchou* in small-pox.

(9) I have sometimes found between the membrane and the muscular part of the heart a considerable quantity of lymph poured out, and the heart as it were œdematous; in other cases this has been found only on one or some parts. —Compare *Burns*, p. 132.

(10) Hence the ancients called such hearts broken up and suppurating.

(11) *Cor pilosum*, *hirsutum*, *tomentosum*, etc. v. *Bose* Pr. s. historiam cordis villosi, Lips. 1771. — Good engravings are given by *Walter* Sur les maladies du cœur, in Mém. de l'Acad. de Berlin, 1785, tab. 4, fig. 1. — *Baillie* Engravings, Fasc. I. pl. 1, fig. 1—3; and *Roux*, and *Bleuland* Icon. anat. pathol. Fasc. I. tab. 1 and 2.—This condition also is not rare in animals; I have seen it in horses, in a cow, and a dog.

(12) Sometimes is the heart so concealed thereby that it almost appears deficient, as it is attached to the diaphragm, but upon its upper surface, smoothly covered with a thick false membrane, between which and the pericardium a large cavity is found filled with serum.

(13) *Pohl* Pr. de pericardio cordi adhærente ejusque motum turbante. Lips. 1775. — *Nebel* Pr. de pericardio cum corde concreto. Giess. 1778. — *J. C. F. Müller* D. de concretione morbosa cordis cum pericardio, casibus aliquot illustrata. 8vo. Bonnæ, 1825.—A partial congenital adhesion has also been found. v. *J. F. Meckel* Anat. Phys. Beob. und Untersuch. p. 87.

(14) *Burns*, On some of the most frequent and important diseases of the heart, &c. 8vo. Edinb. 1809.—*Corvisart*, p. 419, Obs. 56.—Although in the cases here recited, the spots where the polyps were situated were said to be diseased, and therefore might have given rise to effusion during life, I do not, however, comprehend why the fibrous matter which is poured out in exudative inflammation in a fluid form, should not have been washed away by the doubly powerful flow of blood in inflammation of the heart, and thus its coagulation prevented. I therefore think, even in opposition to the grounds laid down by *Kreysig*, Part I. p. 86, that I must for the present firmly hold the doubts I have expressed in my Selt. Beob. Part II. p. 56.

(15) *Baillie*, in his Morbid Anatomy, p. 33, once found the venous valves of the heart inflamed and covered with a layer of coagulable lymph; the latter indeed was deposited only at death, as well as the false membrane which *Burns*, p. 206, found in the right auricle, and *Corvisart*, Obs. 55, p. 419, in the right ventricle.

(16) *J. Abercrombie* found, in a man who had at an earlier period been subject to dyspnœa and palpitation of the heart, the walls of the right ventricle increased an inch and a half in thickness at its base. v. Med. chir. Trans. of Edinb. Vol. I. No. 1, 1824.

(17) *Hunauld* in Mém. de Paris, 1735, Hist. p. 19.—*Lieutaud* Hist. Anat. Med. Vol. II. p. 184. — The review on *Corvisart* in the Hall. Allgem. L. Zeit. Sept. 1813, No. 219, p. 76.—*Kelch* Beiträge zur pathol. anat. No. 60.—I have also sometimes found it, especially with otherwise diseased valves.

§ 181.

Another consequence of inflammation of the heart is the frequent formation of ULCERS and ABSCESSES on this organ.[1]

§ 182.

Lastly, inflammation also frequently produces in the heart many changes of tissue, in consequence of which its normal CONSISTENCE is remarkably altered. To this belongs the LOOSENING or SOFTENING,[1] which, in a minor degree, always accompanies the early stages of inflammation, but, in a higher degree, is so closely connected with the changes of composition and texture consequent on inflammation, that a general disposition of the heart to break and tear to pieces is produced; suppuration and mortification, as might be supposed, are connected with greater softening of the tissue, although we sometimes find, without any distinct mortification, a particular spot on the heart, as it were, rotten, brownish, dryish, and so soft, that it can readily be torn with the finger or the probe. Quite as common is the opposite vice or inflammatory HARDENING of the heart,[2] of which the extent and degree are not less variable. Sometimes indeed only the external membrane of the heart is thickened and hardened; or on the contrary, only the internal coat and the valves composed of it; or finally, more or less of the muscular substance of the heart itself, in which case, either its outer layer may be entirely hardened, or only certain spots through and through. The degree of this hardening of the heart varies very considerably; the most common form is the red hardening, the less frequent the white, which appears to be confined to certain spots, and sometimes goes so far that the hardened spots assume a TENDINOUS[3] and CARTILAGINOUS-LIKE[4] character. The highest degree of hardening occurs in the deposit of EARTH AND BONY MASSES IN THE HEART,[5] which however are, in proportion, very seldom found in the fleshy substance, whereas, OSSIFICATIONS are found, as frequently as extensively, in and beneath the external coat of the heart,[6] in its fibrous parts,[7] and in the internal coat,[8] and at the same time in the valves.[9] Considerable difference is found to exist with reference to the disposition to ossification in particular parts of the heart, inasmuch as the ventricles, the valves on the left side of the heart and the coronary arteries,[10] are more frequently ossified than the auricles, the valves on the right side,[11] and the veins of the heart;[12] and we also find that the deposit of earthy matter is more rare in the venous than in the arterial valves of the heart. The just-described hardening, thickening, and ossification of the valves of the heart, frequently give rise to narrowing of the venous orifices as well as those of the arteries of the ventricle, especially of the left; to deficient motion and shutting up of the valves at these points, and con-

sequently to the irregular flow of blood, which in its turn becomes the cause of many other diseases of the heart.[13]

(1) *Portal*, Vol. III. p. 80. — *Laennec* de l'auscultation médiate, Vol. II. p. 286.—According to *Dundas*, the substance of the heart is too soft and pale in gout and rheumatism.

(2) I found general inflammatory hardening of the heart several times in so high a degree that its substance was quite firm and elastic. I also saw this in a cow which had a needle in her heart, and in a dog destroyed by inflammation of that organ. A few interesting cases of induration of the heart are mentioned by *Testa*, p. 234, and by *Corvisart*, p. 176.

(3) *Albertini* in Comment. Bonon. 1731, Vol. I.—*Scharschmidt* Medic. and chir. Nachrichten Jahrg. III. p. 245.—*Morgagni*, Ep. XLV. 23.—Tendinous tumours. v. *Guest*, Account of an uncommon ossification in the heart in Med. Mus. Lond. 1764, Vol. III. p. 165.

(4) *Columbus* de re anat. L. XV.—*v. Haller* Bibl. med. pract. II. p. 125.—*Veslingius* Obs. anat. et Epist. med. XV.—*Martenus de Cilano* in Act. Acad. Nat. Curios. Vol. IX. p. 357.—*Morgagni*, Epist. XXVII. 17.—*Beauchamp* in *Sédillot's* Rec. période. Vol. V. p. 292.—*Burns*, p. 146.—*Corvisart*, p. 184, (the point of the heart.)—*Kreysig*, Vol. III. p. 173, (the left auricle of the heart.)—I have found often the outer membrane of the heart, and a part of the subjacent tissue, changed into a cartilaginous mass of one or two lines thick. Once I also saw the right auricle of the heart studded externally with small cartilaginous points and spots.—*Laennec*, p. 301, § 783, found pretty often cartilaginous plates in the inner membrane of the left ventricle.

(5) Compare *Haller* Elem. Physiol. Vol. VIII. Part II. p. 78. — *Lieutaud*, Vol. II. Obs. 556–571.—*Reuss* Repertor. Comment. Vol. X. p. 94 and 95.—*de Plouquet* Repertor. Art. Cordis ossa.—Striking instances related by *Boerhaave* Prælect. ad Inst. § 478, (also the septum.)—*Garengeot* in Mém. de Paris, 1726, Hist. p. 24.—*Senac* Traité du Cœur, L. IV. c. 9, No. 5.—*Crüwel* D. de cordis et vasorum osteogenesi, etc. Halæ, 1765, with engravings.—*Mohrenheim* in Wiener Beiträgen, Vol. II. p. 212.—*Simmons* and *Watson* in Medical Communications, Vol. I. Lond. 1784, No. 18, p. 228 and 234, engraved in *Baillie's* Engravings, Fasc. I. tab. 5.—*Michaelis* Prakt. Bibl. Vol. I. Part I. p. 116, in the Appendix.—*Hagström* in Svenska Läkare-Sällskapets Handlingar. Vol. I. Part I. p. 52.—*Renauldin* in *Corvisart's* Journ. de Méd. Vol. XI. Jan. 1806, p. 259, (the left ventricle stony internally with stalactic-like chrystals.) Also in animals ossifications of the heart occur, which I saw at Alfort, on the left auricle in a horse; and in the anatomical Museum at Utretcht a considerable ossification on the heart of a sheep; the entirely ossified hearts of ducks, which *le Meilleur*, v. *Roux* Journ. de Méd. Vol. XXXII. p. 411; *V. Malacarne*, delle Osservazioni in Chirurgia, Part II. Torino, 1784, p. 190; and *Michaelis*, Medic. prakt. Bibliothek. Vol. I. Gött. 1785, mention, were really the inferior male larynx; here perhaps belongs also the whole ossified heart of a goose, which *Cruveilhier*, Essai sur l'Anat. Pathol. Vol. II. p. 77, is said to have seen.

(6) Frequently between the adhering pericardium and heart. v. *Aurivillius* in Nov. Act. Upsal. Vol. I. No. 15, p. 101.—*Crowfoot* in Edinb. med. and surg. Journ. Vol. V. Part XIX. No. 7. — *Kreysig*, Vol. III. p. 268. — *Cruveilhier*, Vol. II. p. 22.—*Laennec*, Vol. II. p. 402.—*Bertin* Traité des maladies du cœur, p. 262.—*Tacheron* Recherches anat. patholog. Vol. III. p. 257 and 261.—Arch. gén. de med. Vol. I. p. 521.—*Louis* Mém. ou Recherch. anat. pathol. p. 298.—*Abercrombie* in Trans. of the med. chir. Soc. of Edinb. Vol. I. 1824, No. 1.—I once found in the cellular tissue between the heart and pericardium many distinct gypsum-like hard corns. In another case large thin points and plates of bone. Ossification and stoniness, which more or less deeply penetrate into the tissue of the heart, are often found on the superfices of unadhering hearts, viz. *Morgagni* Epist. XXVIII. 16. — *Bordenave* in Mém. de l'Acad. des Sc. 1786, p. 53, (in part two inches broad.)—*Prost* Médecine éclairée par l'observation et l'ouverture des corps. Vol. I. p. 140, Paris, 1804.—*Weber* in der Salzb. med. chir. Zeitung, 1811, Part II. p. 80. (I saw this preparation myself, the two bony plates are almost as

large as a pair of oyster shells, and like stone.)—*Burns*, p. 146, (both chambers resembled calcareous boxes.) — *Boeck* D. de statu quodam cordis abnormi. 8vo. Berol, 1818, p. 25 (in the right ventricle.)—*Mayer* in d. Oestreich. medic. Jahrb. Vol. V. Part III. p. 80, (almost the whole upper surface); one instance in College of Surgeons in London, v. *von Froriep's* Notizen, 1823, No. 84, p. 286 (a bony scale on the left ventricle and right auricle.)—*Adams* in Dublin Hospital Reports and Communications, Vol. IV. 1827, No. 19 (one above an inch broad and three lines thick); an instance in Berlin Mus. v. *Rudolphi* Grundriss der Physiologie, Vol. II. Part II. p. 290, note 1.—I saw in the Anatomical Museum at Leipzig large ossifications on the right ventricle and auricle.

(7) Most commonly in the fibro-cartilaginous mass which forms the basis of the chambers of the heart where the bony earth, which is deposited, frequently assumes the shape of rings of the thickness of a finger, which surround the venous openings of the ventricle, especially the left; for example, *Bartholinus* Hist. Anat. Cent. II. Hist. 45, in Pope Urban VIII. a large triangular bone.—*Morgagni* Epist. XXVII. 2.—*Haller* Elementa Physiolog. Addenda, p. 129. *Soemmerring's* additions to *Baillie's* Morbid Anatomy, p. 26, note 49.—*van Heekeren* D. de osteogenesi præternaturali, Lug. Bat. 1797, p. 120.—*Vetter* Aphorismen aus der pathol. Anat. p. 100, § 112.—*Corvisart*, p. 211.—*Howship's* Practical Obs.—*Louis*, p. 298.—My Selt. Beob. Part I. p. 99, and Verzeichn. No. 2233—2235, 3937, 3938.—The chordæ tendineæ of the mitral valve are not unfrequently more or less filled with lime, as I have several times observed. — *Boerhaave*, Prælect. ad Instit. L. V. § 478, found them quasi osseas festucas.

(8) I have several times seen little single earthy deposits on the internal coat of the left ventricle. — *Vesling*, Obs. Anat. et Epist. med. 15, saw the left ventricle lined with a cartilaginous crust.—*Tilling* found one of the carneæ columnæ in the left ventricle ossified. v. *Hufeland's* Journ. Vol. XV. p. 156.—*König* in *Horn's* Archiv f. medic. Erfahr. 1825, March and April, p. 292, a scale of bone in the left auricle; the upper part converted into fibro-cartilage.

(9) Many cases in *Morgagni.—Lieutaud*, Vol. II. obs. § 575—595.—*de Plouquet* Repert. Art. Cord. palpitatio et Valvularum vitia.—*V. Malacarne* Discorso sulla litiasi delle valvule del cuore. 8vo. Torino, 1787. — *Lucas* De depositionibus cretaceis intra cordis valvularum arteriarumque substantiam. 4to. Marburg, 1815. —*Hering* D. de osteogenesi valvularum cordis. 4to. Lips. 1819, with coloured engravings. — I often find deposits of lime on the valves of the left side of the heart, not merely in old men, but also in women, and even in persons who have not attained the adult period, as it appears almost always connected in a certain degree with scrofula, which at Breslau is very frequent and malignant. *Aldis* also found in a man of eighteen extensive ossification of the valves. v. Edinb. med. and surg. Journ. Vol. V. Part XX. No. 5.—The lime also frequently forms strong points on the valves; or grapelike and roundish processes as big as peas, or thereabouts. Good engravings of such ossifications are given in *Sandifort* Observat. anat. path. Lib. I. — *Baillie's* Engravings, Fasc. I. fig. 1, 2, 3, 5.—*Hodgson*, Engravings intended to illustrate some of the diseases of arteries. London, 1815, tab. 1.—*Meckel* Tab. anat. path. Fasc. I. tab. 5, fig. 1—8.—*Hering* also mentions ossification of the aortic valves sometimes occurring in animals. I have seen it, for example, a few times in horses.

(10) *Senac*, L. IV. c. 10.—*Morgagni* Epist. XXIV. 16, 17, in which are mentioned the observations of the ancients.—*Crell* et *Rheinhold* D. de arteria coronaria instar ossis indurata. Vidob. 1740.—*Lentin* Beiträge zur ausüb. Arzneiwissench. Vol. III. p. 113.—*Parry*, On angina pectoris, Lond. 1799; and An Inquiry into the symptoms and causes of the syncope anginosa, Lond. 1801, holds the opinion that ossification of the coronary arteries is the cause of angina pectoris. In favour of this notion are the observations of *Sam. Black* in Mem. of the med. Soc. of Lond. 1805, Vol. VI. No. 2.—*Ring* in Edinb. med. and phys. Journ. No. 95, p. 9.—*Kreysig* in *Horn's* Archiv f. med. Erf. Vol. III. Part I. No. 4, and Krankh. d. Herz. Vol. II. Part II. p. 532, ff. Vol. III. p. 289; in which several cases are collected.—*Ritter* in *Hufeland's* Journ. Vol. XX. p. 117.—*Burns*, p. 157.—*Albers* in Salzb. med. chir. Zeitung, 1815, No. 25, p. 416.—*Louyer-Villermay*, v. Bulletin de la Faculté de Méd. de Paris, 1816, No. 1.—*Jurine* Mémoire sur

l'angine de Poitrine, 8vo. Paris, 1815. — *Schramm* Comment. pathol. de angina pectoris, p. 17. Lips. 1822, with coloured plates.— *Faber* found this in a man who had died from difficult respiration. v. *Hufeland's* Journ. 1827, Aug. p. 79.—We do not, however, by any means always find them ossified in this disease. v. *Testa*, p. 321; on the contrary, there is often great ossification of the coronary arteries without this disease. v. *Hodgson*, p. 59; my Verzeich. No. 2236, 2237, 3938. — *Howship*, p. 64.—*Adams.*

(11) *Bichat*, Anatomie générale, maintains that it never occurs, which *Adams* supports, though wrongly, as the following examples show: *Senac*, p. 428, (of the semilunar valve in two cases).—*Morgagni* Epist. XIV. 35 (the tricuspid valve); XVII. 12 (semilunar valve); XLVII. 16 (tricuspid valve); several cases collected by *Hodgson*, On the diseases of arteries and veins, p. 67.—*Seiler* in *Horn's* Neuem Archiv f. med. Urfahr. Vol. II. Part II. (semilunar valve.)—*Nevin* in Medical Commentaries by *Duncan*, Dec. II. Vol. IX. No. 10, p. 325, (semilunar valve.)—*Corvisart*, p. 210, § 3.—*Horn* in his Archiv f. prakt. Medicin. Vol. IV. p. 296 (tricuspid valve.)—*Burns*, p. 34, (tricuspid valve.)—*Young*, in Journal of Science and the Arts, No. I. p. 49, (tricuspid and semilunar valves.)—*Hall Jackson* in *Corvisart's* Journal de Méd. et Chir. Vol. XIX. p. 468, (tricuspid valve.)—*Cerutti* Beschreibung der pathol. Präparate, p. 113, No. 590.—*Cherrier* D. sur la maladie bleue, etc. Paris, 1820.—*Louis*, p. 318, (tricuspid valve.)—The reviewer in *Gerson* and *Julius* Magazin d. ausl. Litt. d. ges. Heilk. Jan. and Febr. 1828, p. 198.—My Selt. Beob. Part I. p. 98, (semilunar valve); since in another case, on the same place. I also saw at Vienna, in the Pathological Museum, No. 3237, ossification on the tricuspid valve.—[No. 311 Mus. Roy. Coll. Surg. ossification of the tricuspid valve. — No. 309, *ib.* of the bicuspid. — In Mus. St. Thomas's Hospital, a preparation of the mitral valve ossified. T.]

(12) A case by *Bonet*, which I cannot again find; another in Ephem. Nat. Cur. Dec. II. Ann. X. Obs. 175.

(13) *Abernethy*, On a diminution of the area of the aperture, by which the left auricle of the heart communicates with the ventricle of the same side in Medic. chir. Transact. Vol. I. p. 27. — *Corvisart* sur les Maladies, etc. du cœur, p. 204, ff. — *Kreysig*, Vol. II. Part II. p. 583—615. — *Bertin* says that he has seen two hundred cases of enlargement, or aneurysm of the heart, with narrowing of the apertures.—[*Elliotson*, p. 19. T.]

§ 183.

Less distinct are some other textural vices of the substance of the heart consequent on inflammation, although in many such instances they may bear at least some resemblance to those above-mentioned. To these belong the IRREGULAR FATNESS and SPURIOUS FORMATIONS of the heart; the former appears under two shapes, viz. as a mere enormous deposit of fat upon the surface of the heart,[1] which is so much increased and so unequal, that the heart itself, especially if there be much fat deposited at the same time in the mediastina, suffers from want of space and from pressure; or secondly, as a real metamorphosis of the muscular substance, which is then changed more or less completely into fat, and is generally at the same time very flabby and thin.[2] To the SPURIOUS FORMATIONS, which are rarely met with in the heart, belong first many kinds of TUMOURS,[3] especially STEATOMES,[4] HYDATIDS, and other WATERY CYSTS,[5] as well as GRITTY TUMOURS;[6] next, TUBERCLES,[7] and lastly, SARCOMATOUS FOR-

MATIONS of various kinds,[8] even MEDULLARY SARCOMA.[9] The existence of true SCIRRHUS and CARCINOMA upon the heart is still doubtful.[10]

(1) *Lieutaud*, Vol. II. p. 150, Cor adipe obrutum. *Morgagni* Epist. III. 20, XVI. 36, XXVII. 2, XXXV. 18, XLIII. 17, LII. 34. — *Meckel* in Mém. de l'Acad. de Berlin, 1756, p. 79.—*v. Bergen* in Actis Soc. med. Havn. Vol. I. p. 247.—*Pyl* Aufsätze und Beobachtungen aus der gerichtl. Arzneiwissenschaft. Vol. VII. p. 106, (in a drunkard.) *Portal* Cours d'Anatomie médicale, Vol. III. p. 74.—*Testa*, p. 342.—*Fothergill* in Lond. medic. Observ. and Inquiries, Vol. V. p. 233, considers it as giving rise to angina pectoris. — *Corvisart*, p. 197. — *Laennec*, Vol. II. p. 295. — *Schramm*, Comm. pathol. de angina pectoris, Lips. 1822, p. 17, thinks that in the disease described by him there was always great deposition of fat on the heart, pericardium and omentum.—*Wedemeyer.* v. *Rust's* Magaz. Vol. XIX. p. 246, 269, often observed in drunkards great fatness of the heart, with accompanying ossification of the coronary arteries.—I have sometimes found in old persons the heart so surrounded with fat, although there was otherwise great meagreness, that it became mishapen and gibbous.

(2) *Weitbrecht.* v. *Senac* Traité de la structure du cœur, etc. L. IV. Ch. IX. 12. — Edinb. med. and surg. Journ. No. XI. VI. I. Jan. 1806. — *Duncan*, ibid. Jan. 1816, No. XLVI. I. found the greater part of the heart converted into a homogeneous greyish yellow fatty mass.—*Cruveilheir* Essai sur l'Anat. pathol. Part I. p. 183.—*Chardel* Monographie des dégénérations skirrheuses de l'estomac. 8vo. Paris, 1808, (the left ventricle.)—Dublin Hospital Reports and Communications, Vol. II. Part II. (in an apopletic person.)—*Laennec*, De l'auscultation médiate, Vol. II. p. 298, found it merely on the point of the heart.—N. Auserl. Abhandl. zu Gebrauche f. prakt. Aerzte, Vol. IV. p. 4.—*Adams*, ibid. Vol. X. p. 4.—*C. zum Tobel* D. seu singularem casum degenerationis adiposæ cordis, cum aliis vicinarum partium mutationibus conjunctæ, 8vo. Tubing. 1825. — The case related by *Simeon* in the Heidelb. Klin. Annalen, Vol. III. Part II. p. 262, does not belong here, as the narrator mistook the plastic formation on the heart for fat.—I have seen two cases, in which almost the whole of the heart was converted into fat. v. Verzeichn. No. 2226 and 2227.

(3) Where many of the tumours on the heart observed by the ancients belong to, cannot be decided, on account of their deficient anatomico-pathological knowledge at that period, and the not less defective descriptions therefrom arising. To these belong, for instance, the observations which *Lieutaud*, Vol. II. Obs. 544—553, has collected; further, those by *Columbus* De re anatomica, L. XV. p. 489, 492, (hard tumours in the substance of the left ventricle as big as an egg.) —*Rhodius* Observ. Medic. Cent. III. Obs. 4, (follicle in the right auricle of the heart.)—*Schenk* Observ. L. II. No. 203.—*Gantius.* v. *Boneti* sepulchretum Anat. L. II. Sect. 1, addit. Obs. 2 (several tumours on the base of the heart, one of them as large as a pigeon's egg); other cases in *Bonet*, L. II. Sect. VII. Obs. 56, 132, addit. Obs. 9, Sect. 8, Obs. 34; L. III. Sect. 21, addit. Obs. 60.—*Pyl* Aufsätze und Beobachtungen, Vol. VI. p. 78 (on the tip, as a gland, as large as a bean.)

(4) *Penada* Saggio secondo d'osservazioni e memorie medico-anatomiche. 4to. Padua, 1800, (in a duck containing feathers.) Whether the case described by *Fleisch* in d. Allg. Annalen, 1811, Jul. p. 645, as the conversion of the heart into a fatlike cartilaginous mass, weighing six pounds, belongs here, must remain undecided. In the Hunterian Mus. at London I saw a lardaceous tumour on the tip of the heart of an ox, which contained a bony mass. I also found in a man a large lardaceous tumour on the right ventricle near the aorta, consisting of a firm lard-like mass mingled with hydatids. v. my Selt. Beob. Part II. p. 58.

(5) Compare *Lüdersen* D. de hydatidibus Gött. 1808, p. 11.—*Boneti* Sepulchret. anat. L. III. Sect. 37, Obs. 4, L. N. Sect. 12. Obs. 12.—*Morgagni* Epist XXI. 4, Epist. XXV. 15. — *W. Rutty* in Philos. Transact. 1728, p. 562. — *Heuermann* Physiologie, Vol. I. p. 202.—*Salzmann* in *Haller's* Disputat. Vol. IV. p. 248.—*Clossius* in *Baldinger's* Magazin, Vol. X. p. 543.—*Portal* Cours d'anat. médic.

Vol. III. p. 29, 74 (several on the base of the heart, of which one was the size of a small hen's egg.)—*Testa*, p. 64, 67, 277, 278.—*J. F. Meckel* Tab. anat. pathol. Fasc. I. Vol. I. tab. 8, (a large hydatid sac on the left ventricle.)—*D. Price* in London med. chir. Transact. Vol. XI. Part II. 1821, (in a boy of ten years old, who died suddenly, a large single hydatid in the muscular substance.)—*Bernhardi* Observatio circa ingentem cordis tumorem, 8vo. Regiom, p. 22, 1826 (an hydatid externally on the right ventricle.) v. my Verzeichniss, &c. No. 2229.—I saw in Museum pathologicum at Vienna, No. 664, little hydatids on the upper surface of the heart, and the engraving of a heart beset with large hydatids at *Allietti's*, in Venice.—*J. Abercrombie* found a bag containing two ounces of an albuminous fluid on the left auricle of a child.—[In the Mus. at St. Thomas's Hospital, there is a heart with a cyst on its apex, as large as a hen's egg, which was filled with hydatids. T.] — Sometimes we find hydatids attached within the cavities of the heart. v. *Trotter* in Medic. and chym. Essays. Lond. 1796, (two hydatids in the right ventricle of the heart.)—*Dupuytren* in *Corvisart's* Journ. de Médec. Ann. XI. Brumaire, (several large ones in the right auricle.) I saw a large hydatid in the right auricle in the Anat. Mus. at Vienna, No. 4040.—In a man thirty-four years old, who died of struma testis, I saw a large heap of hydatids on the Eustachian valve, hanging by several threads into the right ventricle. v. Selt. Beob. Part II. p. 57, tab. 1, fig. 2. — Hydatids have also been found on the hearts of animals, one as large as an apple on the heart of an ox. v. *Bartholinus* Hist. XXXII. Cent. II.—Privy Councillor *Heim*, at Berlin, in an ox, which he was kind enough to communicate to me in a note on *Baillie*.—In a lioness the size of a hazel-nut. v. Eph. Nat. Curios. Dec. I. Ann. II. 1761, Obs. 5, p. 6.

(6) *Walter* in Mém. de l'Acad. de Berlin, 1785, p. 65, tab. 4, fig. 2.—Museum anat. Part I. p. 163, No. 1086, described and engraved in *Arndt* D. de tumoribus cordis tunicatis. 4to. Berol. 1817, with two engravings, (on the point of the heart of an ox.)—*Cruveilheir*, Vol. I. p. 301, (a little meliceris of the size of a pea.) I have seen three cases in the Mus. pathol. at Vienna, viz. a flat gritty tumour in the substance of the right ventricle of an old woman, and five or six encysted, the size of hazel-nuts, in the mass of the left ventricle of a young man.

(7) Here perhaps belong *Lieutaud*, Vol. II. Obs. 545, 546.—*Heurnius.* v. *Boneti* Sepulchretum, L. IV. Sect. I. Obs. 15, § 13.—*Fr. von Hilden* Observat. chir. Cent. I. Obs. 51.—*Morgagni* Epist. LXVIII. 12, (the right auricle of a boy, fifteen years old, was externally quite beset with it.)—*Portal*, Vol. III. p. 74.—*Abernethy*, Surgical Observations. — *Autenrieth* in Tübinger Blätter, Vol. I. Part II. p. 191. — *Spens* in Edinb. med. and surg. Journ. 1816, Vol. XII. p. 194. — *Lawrence* in Med. chir. Transact. Vol. III. p. 78.—*Laennec*, Vol. II. p. 325, in two cases.—*Andral* and *Bayle*, in Revue médicale franç. et étrangère, Février, 1821, found the heart of a child, as it were, enveloped in the tubercular mass.—*Macmichael* in London med. and phys. Journ. August, 1826.—Although I have dissected a great number of scrofulous men and animals, I have never found a tubercle on the heart, and therefore consider them very rare. [Perhaps the preparation in Mus. St. Thomas's Hospital, mentioned by *Elliotson*, p. 32, as having little scrofulous deposits in the walls of the left ventricle, surrounded by white and almost cartilaginous induration, belongs here. T.]

(8) They especially occur in a threefold form; first, as single little roundish knots deposited between the layers of the valves of the heart; then as white condylomatous growths on the inner surface, and especially on the valves; and, lastly, as more or less spheroidal, smooth, often tolerably large and solid growths, or true sarcoms. The first kind is very common; of the second, instances are given by *Lancisi* De morbis subitaneis, Obs. IV. p. 121.—*Rivière.* v. *Boneti* Sepulchretum anat. L. II. Sect. 8, Obs. 24.—*Morgagni*, Epist. XI. 11.—*Sandifort* Obs. anat. pathol. L. I. c. 1, p. 31; L. III. c. 1, p. 41, tab. 3.—*Corvisart*, p. 223, ff. which he considers of a syphilitic nature, as also does *Scarpa.*—*Bertin*, in Bulletin de la Faculté de Médec. 1812, p. 58, and in Traité des maladies du cœur, p. 232, denies *Corvisart's* opinion that it is syphilitic.—*Testa*, p. 314.—*Laennec* de l'Auscultation médiate, Vol. II. p. 334.—*Desruelles* in Revue médic. histor. et philos. Vol. IV. p. 305, Paris, 1821.—*Wedemeyer* in *Rust's* Magaz.

Vol. XIX. Part II. p. 239, in both auricles.—I have often found it both in syphilitic as well as in many other persons; sometimes it is very large, grape-like, in form of a cock's-comb or a cauliflower. I saw a very large grape-like one on the mitral valve of a syphilitic person in the Mus. pathol. at Vienna, No. 1020. The third kind is most rare, to which perhaps belong several of the tumours on the heart described in note 3 above, as well as in the following.—*Testa*, p. 314, found in a person who had been long afflicted with syphilis, the left auricle so beset externally with this structure, that a second auricle seemed to have been produced. Sometimes they are attached on the inner surface of the heart. v. *Blancard* Anatomie rar. Cent. I. Obs. 75, p. 158.—*Forlani* Obs. rar. med. pract. Dec. I. p. 70; Dec. II. p. 10, found a round tumour as large as a hazel-nut on one of the valves of the heart.—*Söemmerring*, in his additions to *Baillie*, p. 21, note 2, a similar one.—Myself in Selt. Beob. Part I. p. 98, in the right auricle.—*J. F. Meckel* Tab. Anat. pathol. Fasc. I. tab. 7, found fifteen such growths, from the size of a pin's head to that of a hazel-nut, partly within, partly without the heart. — *Nasse* found in the left auricle many pyriform growths with necks. v. his Leichenoffnungen, 1te Reihe, p. 24. — The swellings which *Laennec*, p. 346, describes as végétations globuleuses, appear to be quite different from these sarcomatous growths; they are cyst-like projections of the inner coat of the heart, filled with effused blood, which is sometimes black and coagulated, sometimes deprived of red pigment, as there is more or less coagulated fibrous matter; the smaller are semiglobular, the large more spheroidal, and furnished with necks. I might compare them with the tumours of serous and synovial membrane described above, §§ 81 and 154, note 7. — *Laennec* found them in a phthisical person in the right ventricle.—I have seen them three times in calves, especially a remarkably large one on the mitral valve in the left ventricle. v. Selt. Beob. Part II. p. 53; Verzeichniss, 2228.—There is a similar one in the right auricle of a calf, No. 8610; and many on different parts in one of the two hearts of a double calf, No. 8611, of Bresl. Mus. [In Mus. St. Thomas's Hospital, on the interior of the right auricle of the heart of a man, who had a sarcomatous growth in the nostrils, there are two similar tubercles, one as large as a bean, the other as a pea.—*Rigacci*, fleshy polypus in left ventricle, similar to sarcoma, with vascular connexions, which were injected with quicksilver, in Antologia Firenze. T.]

(9) *Bartzky* Observatio singularis fungi medullaris in corde; præf. *Dzondi*, 8vo. Halæ, 1821, with plates, (a large tumour on the fore and upper surface of the heart.) — *Hodgson*, v. engraving in *Savenko* Tentamen anat. pathol. de Melanosi. 4to. Petropoli, 1825.—*Segalas d'Etchepare* in Revue Médic. franç. et étrang. 1825, Vol. IV. p. 247; and Nouv. Bullet. des Sc. par la Soc. philom. May, 1825, in a boy eleven years old.—In a woman who had medullary sarcom on the fore-arm, there were several such knots on the heart. v. *Gerson* and *Julius* Magaz. d. ausl. Litter. d. ges. Heilk. p. 199, Sept. and Oct. 1823.—*Staupa* Anweisung zur gerichtlichen u. pathol. Untersuchung menschl. Leichname, p. 164. 8vo. Wien, 1827, in an aged man, who had a similar tumour, as large as one's head, in the pelvis on the right ilium.—Another case I saw in the pathological Museum at Vienna, No. 4116, of a man with medullary sarcom on the thigh-bone. There are many such tumours, externally, in the muscular substance and within the right ventricle.

(10) *Carcassone* observed a carcinoma on the heart in a girl who had been long affected with syphilis. v. Hist et Mém. de la Soc. roy. de Médec. 1777 and 1778, Hist. p. 252, Ann. 1786; Hist. p. 320, (there was indeed only one ulcer with hardening.)—*Duchateau* in Journ. de Médec. p. 243, Oct, 1810, a tumour as large as a pea, in a woman who had many cancerous swellings on the skin and on other parts.—*Rullier*. v. Bulletin de la Fac. et de la Soc. de Médec. de Paris, No. 5, p. 367, 1813, in Journ. de Médec. chir. et Pharm. Vol. XXVII. 1813, at the same time, with many scirrhi on other parts; also scirrhus and carcinoma of the heart.—*Dupuytren*. v. *Cruveilhier*, Vol. II. p. 87, (many, above six hundred carsinomatous tumours.)—*Andral* and *Bayle* in Revue méd. franc. et étrang re, Feb. 1824, (three cases of carcinoma.)—*Ib.* Nov. 1825, a case is related by *Recamier*. — *Ollivier* De la moelle épinière et de ses maladies, p. 262. 8vo. Paris,

1824, (a case of cancer.) —*Velpeau* Exposition d'un cas remarquable de maladie cancereuse, etc. 8vo. Paris, 1825.—*Churchill* in London Med. and Phys. Journ. March, 1827, together with scirrhus and carcinoma of other parts. — The cases mentioned appear to me to be more properly included in sarcom that in cancer.

§ 184.

Lastly, in the heart numerous remarkable phenomena as respects its CONTENTS are frequently observed. To these, for instance, belong the ENTIRE ABSENCE, as well as, contrariwise, the unusual enormous GORGING OF BLOOD, the latter of which indeed appears to be very considerable, especially in the right side of the heart, in suffocation, apoplexy, in paralysis of the heart and lungs, as also in persons destroyed by narcotic poisons: next, we have COAGULA OF BLOOD, which are known by the name of CARDIAC POLYPS;[1] these are usually only produced at the time of death, but, in some rare instances, they may be formed during life in consequence of the greater plasticity of the blood and the morbid operation of the walls of the heart upon it, and vary as to size, shape, colour, consistence, &c. without end.[2] Occasionally the heart is found distended with AIR,[3] although there is not the slightest trace of putrefaction in the body. In rare instances, we observe PARASITIC ANIMALS,[4] both on and in the heart, also STONES[5] lying loose in the cavities of the heart, and even different EXTRANEOUS SUBSTANCES,[6] which, having penetrated by external violence, have remained here for a considerable space of time.

(1) *Pissini* Epistola de cordis polyp. App. ad Librum de Diabete. 4to. Mediol. 1654. — *Malpighi* de polypo cordis, 1666, in Op. p. 123. — *Scheid* D. Quæstionum de polypo cordis πενταs. Argent. 1689. — *Zollikhofer* D. de polypo cordis. Witeb. 1689.—*de Berger* D. de cordis polypis. Witeb. 1689.—*Rossen* D. de polypo cordis. Leidæ, 1693.—*Albini* D. de polypis. Franc. 1695. — *Snell* D. de polypo cordis. Giess. 1702. — *de Cruyskerken* D. de polypo cordis. Leid. 1705.—*Gohl* De cordis polypis ex neglectis hæmorrhoidibus. Berlin, 1710.—*Beck* D. de polypo cordis. Giess. 1718.—*Goez* D. de polyposis concretionibus variorum in pectore morborum causis. Altd. 1726. – *Ludolff* D. de polypo cordis. Erford. 1727. — *Teichmeyer* D. de polypis, in specie cordis. Jenæ, 1729.—*Grateloup* D. de polypo cordis. Argent. 1731.—*Boehmer* D. de præcavenda polyporum generatione. Halæ, 1736.—*A. Pasta* Epistola de cordis polypo in dubium revocato. Bergamo, 1739.—*Alberti* D. de polypo cordis. Halæ, 1741.—*Langguth* D. de polypo infantis rhachitici. Viteb. 1744.—*Vaughan*, D. de polypo cordis. Edinb. 1761. — *Goetzke* Casus medico-practicus de polypo cordis, etc. Spiræ, 1764. — *Jos. Pasta* De sanguine et sanguineis concretionibus per anatomen indagatis et pro causis morborum habitis quæstiones medicæ. 8vo. Bergam. 1786.—*Maincourt* D. de sanguineis lymphaticisque male polypis dictis concretionibus in corde et in vasis per vitam existentibus. Paris, 1789.—*Tiedemann* D. de cordis polypis. 8vo. Marb. 1804. – *Pontin* præs. *P. Afzelius* D. de cordis polypo. 4to. Upsal. 1805.—*Gärtner* D. path. med. de polypo cordis in specie infantum. Würceb. 1810, with eight engravings.—*Flormann* Bemerkungen über Polypen im Herzen in Svenska Läkare-Säallskapets Handlingar. Vol. IV. p. 165. Stockh. 1817. — *Simon* D. de cordis polypo. 8vo. Berol. 1818. —*Nasse* zur Kenntniss der Herzpolypen in *Horn's* Archiv f. medic. Erfahrung, 1818, July and August, p. 116. — *Schmelcher* præs. *Münz* D. de polypis cordis. 8vo.

Landishuti, 1819. — *Deegen* D. de polypis cordis. 8vo. Halæ, 1821. — *Heinrich* D. de polyporum cordis genuinorum natura et origine. 4to. Jenæ, 1828.— *A. Meckel* Beiträg zur Lehre von der Entsteh. der Herzpolypen in *J. F. Meckel's* Archiv f. Anat. u. Physiol. 1828, No. 2, p. 166, tab. 6, fig. 4.—As to single observations, compare the writers on diseases of the heart; *de Plouquet* Repert. Art. Cordis polypus, and *Reuss* Repert. Comm. Vol. XIII. p. 117; also in animals, polyps of the heart are not rare.

(2) They occur very frequently on the right side of the heart, on account of the obstruction which the blood meets with in its passage through the lungs, although pretty often also on the left side of the heart; their size is sometimes so considerable, that they become as big as one's fist, and expand the auricle or ventricle, and if they be also firm, compress the muscular fibres flat. Their form is also very various, as they are either like membrane, long and thin, thick at one end and pointed at the other, oval, spheroidal, &c. Their colour varies from black to pale yellow; their consistence is sometimes that of jelly, or of the buffy coat of the blood, of the clot of blood, or of fibrous matter coagulated in different degrees, so that they feel tough, and may be divided into bundles of fibres or concentric layers, whilst interiorly they are hollow, and contain cruor or lymph, which is wrongly considered as pus. Sometimes they lie quite loosely, like balls, even several of them in the cavities of the heart; but generally they are attached so firmly to its walls, and penetrate by so many processes between the fleshy columns, tendinous fibres, valves, and the openings of the small veins of the heart, that we naturally imagine they arise from the walls of the heart. *Kerkring*, in part, also *Senac*, *Morgagni*, but especially *Lieutaud*, both *Pastas*, *Baillie*, *Soemmerring*, *Bichat*, *Vetter*, and myself, in Selt. Beob. Vol. II. p. 54, satisfied me of the contrary; no one as yet has ascertained cellular tissue and blood-vessels in them. Hence it appears to me, that *Meckel's* opinion, v. Handb. der pathol. Anat. Vol. II. Part II. p. 336, that at first they are firmly attached, but subsequently are separated, is not probable. — *Kreysig* thinks that the so-called true polyps of the heart, or plastic coagula in carditis exsudativa, are secreted from the internal membrane of the heart, and that such may subsequently become separated. The former may perhaps be the case in very rare instances. I have, however, at least, a hundred cases before me, in which the internal membrane of the heart was never diseased; so, on the contrary, it may sometimes be inflamed and thickened, without there being any polyps; also, as far as I am aware, plastic membranes may sometimes be separated from mucous, but never from serous membranes, to which class the internal membrane of the heart naturally belongs.

(3) *Morgagni*, Epist. VIII. p. 23, in a hydrophobic person.—Acta Eruditor. Lips. 1721.—*Cheston* in Medic. Observat. and Inquiries, Vol. VI. No. 5.—*Nysten* Recherches de Physiologie et de Chimie pathologique, p. 5 and 167.—*Nasse* insat Leichenöffnungen, 1te Reihe. p. 138.—I have twice observed this phenomenon. [*J. Barlow*, in Med. Chir. Trans. Vol. XV. p. 28, mentions three cases of air in the right auricle, which had entered through the divided orifices of veins during operations; one of them his own, and another *Dupuytren's*, and the third *Mott's*. T.]

(4) Of the many old observations collected in *Plouquet's* Repertorium, it is hardly possible to make use of a single one. Perhaps, however, those mentioned by *Haehne* in Actis Nat. Cur. Ann. VII. p. 53, belong here. We very rarely find the cysticercus cellulosæ in the human heart. v. *Rudolphi* Entozoorum Synopsis, p. 546, (once three pieces.)—*Dubreuil* in Ephémérides médicales de Montpellier, Nov. 1826, in the right auricle. Rarely also in swine, viz. at Alfort. v. *Rudolphi* Bemerkungen auf einer Reise, Vol. II. p. 62; and *Dupuy* De l'affection tuberculeuse, Paris, 1817, p. 267.—Ascarides have several times been found in the hearts of dogs; for example, *Peysson*, in Annales de la Soc. de Méd. prat. de Montpellier, Vol. XV. p. 49. v. Journ. de Médec. continué, Vol. XI. p. 441.—*Zeviani* in Memor. della Soc. Ital. Vol. XIV. Part II. p. 152, (one in the left ventricle.)—*Bobe-Moreau* in *Sédillot's* Journ. général de Médec. Vol. XLVII. p. 4. May, 1813.—*O. Fabricius*, in Fauna Groenland, p. 272, No. 250, found ascarides in the heart of a living phoca fœtida, which had been wounded by a harpoon; and also ophiostoma dispar, *Rud.*—*Paullinus*, in Observ.

med. phys. in Eph. Nat. Cur. App. ad. Dec. II. Ann. V. p. 19, found a filaria on the heart of a duck.—*Daldorf*, s. Dansk. Selsk. Skrift. Vol. II. 2. p. 159, saw an intestinal worm on the heart of a squalus; in anodonta ventricosa in the substance, and in the cavities of the heart, distoma duplicatum; and in paludina vivapara, &c. in the auricle of the heart, cercariæ. — *von Baer* in Nov. Act. N. C. Vol. XIII. Part II. p. 559, 616, and 617. [*Abercrombie*, in Edinburgh Med. Chir. Transact. Vol. I. p. 53, found a cyst in the left auricle, containing others collapsed, in a dark fluid. *Andral*, Précis, Vol. II. p. 332, frequently found cysticerci in the hearts of measly pigs; also, in a patient at La Charité, he found three vesicles, as large as filberts, in the heart. *Elliotson*, p. 32, found in the ventricles of the heart innumerable thin globular cysts, attached by peduncles. T.]

(5) Compare *de Plouquet* Repertor. Calculus in corde. These observations are almost all inapplicable.—*Bartholin* Hist. anat. Cent. VI. Hist. 93, p. 364, thought that the stone found in the heart of a stag might have been an encrusted bullet, which is possible, although such stones arise like phlebolithi, or as in the necked processes in serous membranes. 5. § 183, note 8, towards the end.

(6) For instance, bullets, which it is probable had penetrated deeper, whilst the parts behind them had healed:—thus, in a man who had received a shot in his breast several years before, a flattened bullet was found in the anterior ventricle. v. *Penada* in Saggi di Padova, Vol. III. Part II. p. 59. — A similar case described by *Maussion*, in Dict. des Sciences médic. Vol. IV. p. 216; and *Boyer*, Traité des maladies chirurgical. Vol. VII. 8vo. Paris. — Edinb. med. and chirurg. Journ. Vol. V. p. 417. — This has been observed several times in animals. v. *Vorwaltner* in Misc. Acad. N. Cur. Dec. III. Ann. V. and VI. Obs. 3, p. 228, (in a stag).—Eph. Nat. Cur. Dec. II. Ann. VI. Obs. 77, in a dog. — London medical and physical Journal, by *Fothergill*, Vol. XXXVI. Nov. 1816, (in an abscess of the substance of the heart of an apparently healthy deer.) — More frequently nails in cattle. Ann. X. Obs. 171, Schol. p. 313; and especially needles in cows. v. *Hoffmann* in Ephem. N. C. Cent. IX. and X. p. 462. — *Peyer* Parerga, Salzburger medic. chir. Zeitung, 1812, I. p. 227. — *Gebhard* in *Teuffel's* Magazin f. theoret. und prakt. Thierheilkunde, Vol. I. Part II.—In my Selt. Beob. Part I. p. 99; and Verzeichn. No. 2238. — *Schwab* Materialien zur pathol. Anat. der Hausthiere, 1te Lief. p. 15, a piece of scissors. — A needle in the heart of a sheep. v. *Maret* in Mémoir. de Dijon, Part I. Hist. p. 107.—A broken clock-maker's file, which had penetrated through the left into the right ventricle, was extracted after twenty-one days.—*Ferrus* in Répert. gén. d'Anat. et de Physiol. pathol. Vol. II. Part II. p. 402, engravings, pl. 8, fig. 1; by whom are also mentioned some examples of bullets, needles, and file points which have been found in the heart.

THIRD CHAPTER.

Of the Arteries.[1]

§ 185.

As the circulation of the blood is a necessary condition of the existence and formation of the organs[2] in men and in the higher animals, there cannot be a complete absence of the blood-vessels, especially of the arteries; there may, however, be a partial deficiency in them, but only in proportion to the vices of the parts for which they were destined.[3] If therefore, the vessels, which according to their proper arrangement supply an organ with blood, are destroyed, the part becomes dry,

owing to deprivation of its usual supply of blood.[4] For this reason also, in the most imperfect monsters, to which especially many of those which are headless belong, there is always a vascular system proportioned to their size and extent.[5] But as the normal mass of blood, which is proportioned to the size and activity of the part, may be conveyed to it in a usual or unusual manner, as well as by a large vessel, or by many small ones, so with reference to the number, size, connexion, ramifications and position of the arteries, we shall find there are very frequent and diversified VARIETIES,[6] the most important of which will be here treated of.

(1) *Faselius* D. s. morbos arteriarum, Jenæ, 1757.—*Langsworth* Theoria med. de arteriar. et venar. in corpore humano adfectionibus, Vol. I. 4to. Prag. 1763.—*Alex. Monro*, Remarks on the coats of arteries, their DISEASES, &c. in Edinb. med. Essays and Observations, Vol. II. p. 264.—*Malacarne* Osserv. sopra alcun. arterie nel corpo umano nello stato preternaturale et nello stato morboso in osserv. in Chirugia, Vol. II. p. 119. Torino, 1784, ff.—*Lane* D. de arteriarum morbis, etc. L. B. 1787.—*H. Watson*, Account of a large aneurysm, with some introductory reflections on THE ARTERY IN ITS DISEASED STATE in Medic. Commun. Vol. I. p. 178.—*Freer*, Observations on Aneurysm and some diseases of the arterial system. Birmingham, 1807.—*Hodgson*, a Treatise on the diseases of Arteries and Veins, containing the pathology and treatment of aneurysms and wounded arteries, &c. 8vo. Lond. 1815; second edition, Lond. 1822; translated into German by *Koberwein*, with remarks by *Kreysig*, Hanover, 1819; translated into French by *Breschet*, with notes. 2 Vols. 8vo. Paris, 1819.—Engravings to illustrate some of the diseases of the arteries. fol. 1815.—*J. F. Meckel* Tabulæ anat. pathol. Fasc. II. Vasa. fol. Lips. 1820.—*Engelhardt* D. s. succinctam systematis arteriosi pathologiam. 4to. Lips. 1821.—*C. H. Ehrmann* Recherches sur la structure les fonctions et les alterations organiques des artères, p. 32. 4to. Strasb. 1822. ff.

(2) This appears to me a better mode of expressing it than that of *A. Serres* in Bullet. de la Soc. méd. d'Emulation, Sept. 1821, who finds in malformation of the vessels, the cause of almost all malformations of the fœtus, especially the deficiency and excess of parts, though indeed the common origin of deficiency or excess of parts and their blood-vessels is, as is well known, one and the same variation in the formative impulse. It appears rather, however, as if the principle determining the form arose out of the nervous system.

(3) The observations on deficiency of all blood-vessels in monsters, viz. in an acephalous monster, v. *Schellhammer* in Ephem. Nat. Cur. Dec. II. p. 253, 1690, ff. (in the right lower extremity of a child.) v. *Chaussier* in Bullet. de la Fac. de Médec. Vol. V. p. 405, are certainly founded in error, since the small and delicate vessels are overlooked.

(4) Hence sometimes spurious formations are produced and nourished by absorption; I have, however, always found small arteries and veins.

(5) In the acephala, of which the heart is notoriously naturally wanting, we find either merely an umbilical vein dividing like an artery, or the umbilical arteries also; sometimes even the aorta and vena cava with several branches; even in the most imperfect monsters, which have been described by *Vrolik*, Mémoires sur quelques sujets intérressans d'Anat. et de Physiologie par *Fallot*, p. 25—64, Amst. 1822; and *G. Lieber* D. Monstri Molæ speciem præ se ferentis descriptio anatomica. 4to. Berol. 1821.—As also in a head born alone. v. *Rudolphi* in the Schriften der Acad. der Wiss. zu Berlin f. d. Jahr. 1816; and in a monstrous goat, which consisted merely of a foot, v. *Ign. Hayn* Monstri unicum pedem referentis descriptio anatomica, 4to. Berol. 1824, arteries and veins were found.

(6) Compare most of the writers on the vessels, especially *Haller*, *Mayer*, *Söemmerring*, *Meckel*, further *Timmermann* D. de notandis circa naturæ in hum. machina lusus. § 50. Rintel. 1765, ff.—*Nicolai* D. de directione vasorum in *Haller's* Coll. Disput. anat. Vol. II.—*Ludwigii* Progr. observat. angiol. tradens. Lips. 1764.—*Sandifort* De notabilioribus vasorum observationibus in Obs. anat. pathol. L. IV. and VIII. — *Loder* D. Nonnullæ arteriarum varietates. Jenæ, 1781.—*Penchienati* in Mém. de l'Acad. des Sc. de Turin. P. I. 1786.—*Wrisberg* Varietatum angiologicarum per XXX. annor. seriem in corp. hum. observatarum. P. I. Göett. 1791.—*Burns*, Observations on some of the most frequent and important diseases of the heart, and on the unusual origin and distribution of some of the large arteries of the human body. Edinb. 1809. — *Zagorsky* in Mém. de l'Acad. Imp. des Sc. de St. Petersburg, Vol. I. and II; he also read, on the 30th of May, 1827, in the Academy: Abnormitas quæ ad ortum et numerum quarundam arteriarum observata. —*Koberwein* D. de vasorum decursu adnormi ejusque vi in omnem valetudinem varia. Viteb. 1810. — *Fleischmann* in the Abhandl. der physical. med. Societät zu Erlangen, Vol. I. and II.—*Ryan* D. de quarundam arteriarum in corpore hum. distributione. Edinb. 1812.—My Selt. Beob. Part I. p. 100; Part II, p. 60.—*J. F. Meckel* Tab. anat. pathol. Fasc. II. Lips. 1820. —*Fr. Tiedemann* Tabulæ arteriarum corp. hum. Fasc. I—IV. gr. fol. Carlsruhæ, 1822.—*Schoen* D. de nonnullarum arteriarum ortu et decursu abnormi. 8vo. Halæ, 1823.

§ 186.

The trunk of the PULMONARY ARTERY is not merely wanting, if the organs for which it is destined, viz. the lungs, are deficient, but also not unfrequently when they exist, in cases of unusual form of the heart, in which case the arteries supplying the lungs with blood usually arise either as a distinct but later given off trunk, or else as two vessels from the root of the aorta;[1] more rarely from their ascending portion[2] or even from the branches of the aorta.[3] Sometimes the trunk of the pulmonary artery exists, gives off no pulmonary branches, but runs branchless as the *ductus arteriosus* into the aorta;[4] in other instances the pulmonary artery, otherwise normal, forms no connexion with the aorta, so that the *ductus arteriosus* is entirely wanting.[5] On the contrary, we observe very rarely a distinct duplicate of the pulmonary artery, in this case, for instance, besides the pulmonary artery, a particular *ductus arteriosus* arises from the right ventricle,[6] or a second vessel opens itself into the true pulmonary artery.[7] This formation is followed by those very rare cases in which the lungs, besides their usual pulmonary artery, are supplied from some other accessory branches.[8] More frequently we observe an irregular origin of the pulmonary artery from the heart, in which, for instance, it originates not from the upper part, but rather from the middle of the right ventricle,[9] out of a special little third part of the heart,[10] out of both ventricles at once,[11] or from the left ventricle together with the aorta.[12] In several cases we see, in the normal entrance of the veins into the heart, a transposition of the pulmonary artery and aorta, so that this

springs from the left and that from the right ventricle.[13] Another vice, which in the blue disease is not uncommon, is the unnatural narrowing or actual closing up of the pulmonary artery, either at its origin, or still higher up,[14] in which cases the blood is usually conveyed from the aorta, through the wide *ductus arteriosus* to the lungs.[15] The contrary state, the too great capacity of the pulmonary artery, is much more rare.[16] Finally, the division and subsequent course of the pulmonary artery sometimes varies; so that from its left branch, a twig is sent to the left subclavian,[17] from its right branch to the *truncus anonymus*,[18] from its division, the right subclavian;[19] from the *ductus arteriosus*, the left subclavian;[20] at the separation of the pulmonary branches, the left subclavian and descending aorta, or the left carotid, subclavian and descending aorta;[21] and more frequently besides the pulmonary branches, the descending aorta merely is given off.[22]

(1) Such cases were observed by *Farre, Wilson, Standert, J. F. Meckel, Seidel, Beckhaus, Mayer, Cerutti,* and myself in three cases, in the above-mentioned place, § 172, note 11.—*Lietzau* Hist. trium Monstror. p. 19, 8vo. Regiom, 1825, in a double sheep.

(2) *J. F. Meckel* Descriptio monstrorum nonullorum, p. 11.

(3) In a rabbit, from the subclavian. v. *Legallois* in Bulletin de la Soc. de Médec. p. 99, 1809.—Compare *Reil's* Archiv. Vol. XII. p. 122.—I also saw in a double monster an artery from the truncus anonymus pass to the accessory lung. v. Selt. Beob. Part I. p. 16.

(4) I found it so in a monstrous sheep without lungs. v. my Verzeichniss, 2949.

(5) Such cases were observed by *Stenson, Bartholin, Sandifort, Chemineau, Kreysig, Knox.* — Compare § 172, note 11. — *Meckel* in *Reil's* Archiv. Vol. IX. p. 437.—My Selt. Beob. Part I. p. 16, in No. 8025 of Bresl. Mus. and in another monster, hereafter to be described, with abdominal cleft and hernia cerebri.—*Gamage* in New-England Journ. of Med. and Surg. Vol. IV. p. 244.

(6) *Wrisberg* addend. to *Haller's* Physiologie, p. 77.

(7) *Hall* and *Vrolik* in Praktisch Tydschrift voor de Geneeskunde, Part II. 1825.

(8) For instance, a large branch from the aorta in the region of the sixth dorsal vertebra for the lobes of the right lung. v. *Huber* in Act. Helvet. Vol. VIII. p. 85, a similar twig for the under lobe of the left lung. v. *J. F. Meckel* in his Archiv f. d. Physiologie. Vol. VI. p. 454. — Branches from the frenic arteries for both lungs. v. *Mangers* in *Sédillot* Recueil périodique, Vol. XIII. p. 74; and in *Corvisart* Journ. de Médec. Ann. X. Pluviose.—Or with very small pulmonary arteries, equally for both lungs from the pericardial arteries. v. *Jacobson* in *Meckel*, Vol. II. p. 134, ff.

(9) *Hodgson* and *Leadam* in *Farre.*

(10) *Lawrence* in *Farre*, p. 26.

(11) This was observed by *Cooper, Farre, Bock, Horner.*

(12) *Mery* in Mémoires de Paris, 1700, Hist. p. 54.—*Richard K. Hoffmann* in New-York medical and physical Journal, Vol. VI. p. 250.—*Marechal.*

(13) *Baillie*, Engravings of morbid Anatomy, Fasc. I. pl. 6, fig. 1 and 2.—*Wistar* System of Anatomy, Vol. I. Pennsylvania, 1811.—*Langstaff* in London Medical Review, Vol. IV. and in *Farre*, p. 28.—*Farre*, p. 29, with plates, fig. 14. —*J. F. Meckel* Tabulæ anat. pathol. Fasc. II. p. 1 and 2, (in a lamb and a calf,) and Descriptio monstror. nonullor. p. 21, (in a hemicephalic monster.)—*Tiedemann* in his and *G. R.* and *L. Ch. Treviranus* Zeitschrift für Physiologie, Vol. I. Part I. p. 111, tab. 7, f. g.—*E. d'Alton* D. de cyanopathiæ specie ex invicem

p. 65. 1808.—*Legallois* in Bulletin de la Soc. de Médec. 1800, p. 99, (in a rabbit) *J. F. Meckel* Handb. der pathol. Anat. Vol. II. Part I. p. 97. — *Rudolphi*, v. *Bernhard* D. de arteriar. e corde prodeunt. aberrationibus. 4to. Berol. 1818, with engravings.—*Breschet* in Répertoire gén. d'Anat. et de Physiol. pathol. Vol. II. Part I. p. 14.—Myself in my Selt. Beob. Part II. p. 60; and Verzeich. No. 1922.—More rare is the case which I found in a child with frenic rupture, deficient fingers, &c. No. 8025 of Bresl. Mus.; viz. that the descending aorta, which arose from the pulmonary artery, after giving off the left art. subclavia, passed to the right between the gullet and the second dorsal vertebra, and turned again downwards and to the left to the hole in the diaphragm.

(12) *Potthoff* D. s. Descriptionem casus rarissimi spinam bifidam totalem exhibentis, p. 9. 4to. Berol. 1827.

(13) Myself, Monstrorum sex humanor. anat. et physiol. disquisitio, p. 38. Francof. ad Viadr. 1811.

(14) In a few instances, which I have already described in my Selt. Beob. Part II. p. 71; and Verzeichn. No. 1988, it divided about the third or fourth lumbar vertebra.—*Petsche* also found it divided early, and the two iliac arteries connected with each other by a transverse branch. v. Syllog. Observat. anat. select. § 77; rec. in *Haller* Coll. Diss. Anat. Vol. VI. p. 781.—It divided very early, in a case by *Wehrde* D. anat. pathol. de monstro rariore humano. 8vo. Halæ, 1826.—This variety would partly render impracticable compression of the aorta in active hemorrhage after birth.

§ 188.

As to the individual branches of the aorta, these present not a few and somewhat interesting varieties. Thus we find, for instance, instead of two coronary arteries to the heart, only one,[1] or more frequently three, and even four; or finally, they have unusual origins, viz. higher up from the aorta,[2] and in one instance from the *subclavia dextra*,[3] &c. Very frequently the number, origin, and course of the great vessels[4] arising from the arch of the aorta vary, as in rare cases they originate from one common short trunk, or more frequently from two, or finally, still oftener, by a greater number than usual, that is, by four, five,[5] and even six,[6] so that instead of from the *innominata*, the right *subclavia* and *carotis* arise separately from the aorta; or the vertebral arteries, one of the thyroid, one of the thymic, or the internal mammary, arise from the arch of the aorta. In operative surgery, the most important are, the origin of a middle inferior thyroid, which arises from the arch of the aorta, the *truncus anonymus* or the *carotis*, and ascends directly in front of the air-tube to the thyroid-gland;[7] the crossing of one *carotis* upon the air-tube, as for instance, the left arising from the innominata, or the right unusually far on the left side; and the origin of the right *subclavia*, from the left side, in which case it usually proceeds between the spine and the gullet;[8] more rarely between the latter and the air-tube,[9] or still less frequently before[10] these to the right arm. In some instances the right *subclavia* did not arise so far to the left, and only lay behind the right[11] or behind both[12] carotids at their division.

11x respecting the Osti v. Lafosse Cours d'hippiatrique fol Paris
B. Clark in Linn. Trans. bol 3. p 289. – B. Harwood. of the Osti infesting
the frontal sinuses of ~~some~~ various animals, in his System of Comp. Anat. 4to
London

Macleay

~~Examined 98 MS to 1870~~

To follow this is ~~that they~~ as
and to assign the reason why
To follow this I am not content
I be well informed which way you went.

add note 58 par 133
Canines in the molar teeth of an Elephant No 656, 657 Mus Roy Coll. Surg. were
extracted by [illegible]

Deficient lower jaw in spy No 79. Mus. Roy. Coll. Surg.

Andral Vol 1 p 495. and further observes that a very remarkable point in their
characters is the disposition & form at the same time in a great number of organs.

(1) I have once observed this.

(2) *Farre*, p. 2, ff.

(3) *Mayer* in *Graefe* and *v. Walther's* Journ. f. d. Chir. Vol. X. p. 44.

(4) *Huber* De arcus aortæ ramis in Actis Helvet. Vol. VIII. p. 68—102.—*Walter* Mém. de l'Académ. des Scienc. de Berlin, 1785, p. 57, ff.—*Tiedemann* resp. *J. N. Bayer* D. de ramis ex arcu aortæ prodeuntibus. 4to. Salzb. 1817, with lith. plates.—*Zagorski*, *Malacarne*, and *Fiorati*.—*Thilow* in den Allg. medic. Annalen, March, 1817, p. 289. — I have also sometimes observed in animals varieties respecting these branches.

(5) *Ph. Ad. Böhmer* De quatuor et quinque ramis ex aorta ascendentibus. Halæ, 1741.

(6) *Penada* Saggio terzo di Osservazioni patologico-anatomiche. Padova, 1801.—*F. Müller*, v. *Meckel's* Handbuch der menschl. Anatomie. Vol. III. p. 84, note 21.—*Tiedemann* Tabulæ arteriar. Fasc. I. tab. 4, fig. 5.

(7) This anomaly was first described by *Neubauer*, Descr. anat. arter. innominatæ et thyreoideæ imæ in Op. Anat. collect. p. 287, note o. — *Tiedemann* gives a good engraving of it in his Tab. 3, fig. 11.—I have only found this variety once, but the origin of the thyreoidea ima below from the truncus anonymus I have seen twice; both varieties, as well as the following, are very important in tracheotomy.

(8) *Böhmer*, fig. 1.—*Fabricius* Proëmticum nonnullas observationes sistens, ad Diss. *J. B. Hoffmanni*. Helmst. 1751, p. 10.—*Mieg* Spic. observat. anat. et botanicar. Basil. 1753, Art. 8. — *Loesecke* Observat. anat. chir. med. Berol. 1754, p. 26. — *J. F. Meckel*, the grandfather, Ep. ad *Hall*, Vol. III. p. 132, 141.—*Ludwig* Progr. observat. angiologicas tradens. Lips. 1764, p. 5.—*Pohl* Observat. angiol. de arteriis. Lips. 1773, p. 7. — *Neubauer*, § 13. — *Murray* Abhandlungen der Schwed. Akademie. Vol. XXX. p. 92.—*Schleitz*, *ib.* p. 98. — *Sandifort* Mus. anatomicum, Vol. II. tab. 106, fig. 2.—*Hulme* in Soc. of London, 1789, Vol. II. p. 271, ff. — *Autenrieth* resp. *Pfleiderer* D. de dysphagia lusoria. 8vo. Tubing. 1806.—*Obet* in Bulletin des Sc. médicales, reviewed by *Graperon*, 1808, Vol. II. p. 65, ff. — *Koberwein*, p. 16. — *Herold* D. exhib. observationes quasdam ad corp. hum. part. struct. Marburgi, 1812, p. 7. — *Fleischmann* Leichenöffn. Erlang. 1815, p. 213. — *J. F. Meckel* Handb. der pathol. Anatomie, Vol. II. Part I. p. 98; also in a hedge-hog. v. *Cuvier* Anatomie Compar., Vol. IV. p. 699, which has been observed by *Tiedemann*, and Tabul. arteriar. Fasc. I. tab. 2, fig. 6; the engraved case appears to belong here.— *G. W. Stedmann*, in Edinb. med. and surg. Journ. Oct. 1823, No. 77, with plates. — Perhaps also *Hart*, *ib.* April, 1826. — *Mayer* in *v. Graefe* and *v. Walther's* Journ. der Chir. Vol. X. p. 44. — *Cerutti* Rarior. monstri descript. anat. Lips. 1827. — I have seen these varieties six times; compare my Selt. Beob. Part I. p. 100; Verzeichniss, No. 1923, 2247, 2248, 8683 of Bresl. Mus. and in two cases not preserved. In neither case had difficult swallowing occurred, which had already been missed by *Fleischmann* and *Koberwein*, whilst *Bayford*, *Hulme*, *Monro*, *Autenrieth*, and *Murray*, have mentioned a peculiar kind of dysphagia (lusoria). This variety is important in the operation of tying the subclavian artery, because its inner part naturally lies deeper, *i. e.* more backwards. It is interesting, that sometimes the left subclavian, which, in altered position of the aorta, mostly arises from the right, passes behind the gullet to the left arm. v. *Fiorati* Saggi scientifiche di Padova, Vol. I. p. 69, 70; and myself in Selt. Beob. Vol. II. p. 61.

(9) *Bayford* D. de dysphagia lusoria. v. Memoirs of the med. Soc. of London, Vol. II. 1789, p. 271. — *Alex. Monro* D. de dysphagia, Edinb. 1797, and in Outlines of the Anatomy of the human Body, Edinb. 1813, Vol. III. p. 277, pl. 43.—*Zagorsky*, Vol. II. p. 318, tab. 2, fig. 7.—*Herold* D. exhib. observationes quasdam ad corp. hum. part. struct. Marburgi, 1812.—*J. F. Meckel*, p. 100.—*Hesselbach* Beschreib. der pathol. Präparate zu Würzb. p. 181, No. 604, and p. 212, No. 587.

(10) *Hunauld* in Mém. de l'Acad. des. Sc. 1735, Hist. p. 28, No. 7. — *Walter* Mém. de l'Acad. des Scienc. de Berlin, 1785, Vol. III. p. 62, tab. 3, fig. 5.

(11) *Huber* in Actis Helvet. Vol. VIII. p. 75, fig. 3.

(12) *Walter*, tab. 3, fig. 4.

§ 189.

The further course of the arteries originating from the arch of the aorta is sometimes irregular, in a manner peculiarly interesting to operative surgery; thus, the COMMON ARTERY OF THE HEAD, from which, in rare cases, large unusual branches are given off, divides at once,[1] very early,[2] or on the contrary, very late and not distinctly,[3] into external and internal branches; the CEREBRAL CAROTID was in one instance entirely deficient on one side;[4] in anencephala, the cerebral carotid as well as the vertebral arteries are mostly very small, thin coated, and even terminate in blind extremities. The superior THYROID ARTERY is sometimes wanting on one side, or is not unfrequently double; the OCCIPITAL ARTERY in many cases takes its origin from the cerebral carotid. The EXTERNAL MAXILLARY ARTERY is sometimes remarkably small, and its place is then supplied by the so-much larger transverse facial artery. The VERTEBRAL ARTERY is not unfrequently very small on one side and as much larger on the other; sometimes it is more or less double, sometimes indeed only at its origin,[5] sometimes still higher up; it has been seen even three-fold;[6] not unfrequently it proceeds superficially on the spine, in order to make its first entrance into the fifth, fourth, and even the third or second cervical vertebra; in one instance its upper part was perforated by the *nervus hypoglossus*.[7] The inferior THYROID ARTERY is sometimes wanting on one side, it arises also double, or the left and right spring from a common trunk;[8] sometimes they lie very loosely; are very uncommonly tortuous, &c. The internal MAMMARY ARTERY was, in one case, formed of three parallel descending vessels, of which the outer two were only connected by a small transverse branch;[9] in another case it gave off a large external branch, which passed upon the first four ribs.[10] The ARTERY OF THE ARM varies very frequently and differently in respect to its course and division;[11] in a practical point of view, the most important anomalies are, that the artery gives off a *vas aberrans*, which descends more or less completely to the elbow-joint, and here terminates either in the principal trunk or in one of the arteries of the fore-arm; the artery divides higher than usual, and not unfrequently even in the arm-pit, into two branches, which lie close by each other; and of the two, the abnormal sometimes very superficial, that is, close beneath the skin, is most frequently the radial, more rarely the ulnar, or lastly, and the most unusual, the interosseal artery; the RADIAL ARTERY in very rare instances is entirely wanting, and then can no pulse be felt on the

fore-arm;[12] it divides too high, in which case, its palmar branch, taking the direction of the trunk of the radial, gives rise to mistakes in feeling the pulse,[13] or its dorsal branch runs down on the fore-arm superficially, and is easily wounded; the ULNAR ARTERY, instead of its usual deep course, descends superficially;[14] and finally, the INTEROSSEOUS ARTERY sends off an anomalous twig on the inside of the fore-arm, which lying nearer to the skin than itself, runs to the palm of the hand.

(1) A case of this kind in a monster I have described in my Selt. Beob. Part I. p. 16.

(2) *Morgagni* De sed. et caus. morbor. Epist. XXIX. 20. — *Burns*, Diseases of the Heart, p. 327.—*Ryan*, p. 4. I have seen it a few times divided an inch or two deeper than common.

(3) *Burns*, p. 326 and 327.

(4) *Tode*, Medic. chir. Bibliothek. Vol. X. p. 401.

(5) For instance, with one origin from the aorta; with another from the left subclavia. v. *Huber* in Act. Helvet. Vol. VIII. p. 73. — *Henkel's* Anmerk. von wiedernatürl. Geburten, Part II. p.10; with both origins from the right subclavian. v. *J. F. Meckel* Handb. der menschl. Anatomie, Vol. III. p. 135.

(6) Viz. two origins from the right subclavian, and a third from the inferior thyroid; all three united together between the fourth and fifth cervical vertebræ. v. *A. Meckel* in *J. F. Meckel's* Archiv für Anat. und Physiol. 1828, No. 2, p. 170, tab. 7, fig. 4.

(7) The wax model of it is in the Anatomical Museum of the Joseph Academy at Vienna.

(8) *Burns*, p. 331.

(9) I saw this rare preparation in the Anat. Mus. of the Surgical Academy at Copenhagen.

(10) v. my Selt. Beob. Part II. p. 62, Verzeichn. No. 1931, and once since. It may be easily seen that this anomaly may, in penetrating wounds of the chest, fractured ribs, &c. give rise to internal hemorrhage.

(11) *C. G. Ludwig* Progr. de variantibus arteriæ brachialis ramis in aneurysmatis operatione attendendis. Lips. 1767.—*J. F. Meckel* Ueber den regelwidrigen Verlauf der Armpulsadern; in his D. Archiv f. d. Physiol. Vol. II. p. 117—131, and in Tabul. anat. pathol. Fasc. II. tab. 11.—*Fr. Tiedeman* Beobachtungen über die hohe Theilung der Armschlagader in die Speichen-und Ellenbogen-Schlagader; in the Denkschriften der Akad. der Wissench. zu München, Vol. VI. p. 3, ff. and in Tabul. arteriar. Fasc. II.

(12) I have observed this during life and after death, on both arms of an aged woman; from the radial artery there is merely the recurrent and a few little muscular branches; the descending trunk is entirely wanting; hence the interosseal is larger, and gives off the branch to the hand, which is naturally sent from the radial. Compare No. 8531, Bresl. Mus.

(13) *Burns*, p. 343, in which he relates an observation of *Dr. Baird*, according to which three persons in the same family were subjects of this anomaly.

(14) *Tiedemann*, Tabula Arteriarum, Tab. XVII. fig. 1.—*Burns*, p. 341, saw it three times. I have only to the present time seen it once.

§ 190.

Not fewer varieties are exhibited by the ARTERIES ARISING FROM THE DESCENDING AORTA. Thus we sometimes find the BRONCHIAL ARTERIES very much enlarged in persons affected with the blue disease;[1] the origin and course of the intestinal

and mesenteric arteries vary uncommonly; in large umbilical ruptures and protrusion of the abdominal viscera, their ARTERIES are very deficient;[2] the INFERIOR MESENTERIC ARTERY in an otherwise well-formed child was deficient,[3] and in one case of high division of the aorta, it arose from the common iliac artery;[4] the *arteria omphalo mesaraica*, not merely in new-born children, but even in adults, still remains distinct;[5] the RENAL ARTERIES are very commonly irregular in number and origin, sometimes there are five instead of two, and in one instance the arteries of both kidneys arose by a common trunk from the front of the aorta close to the superior mesenteric,[6] or lastly and more commonly, in congenital abnormal position of the kidneys, their arteries also arise irregularly, viz. lower down from the aorta, from the *iliaca communis*, the *hypogastrica*, and even the *sacralis media*,[7] &c. The PELVIC ARTERIES also vary frequently; to these first belongs, the UMBILICAL ARTERY, which especially in malformed, although also frequently in well-formed children, is entirely deficient on one side,[8] or as an approach to such formation, is unusually small, sometimes has an unnatural origin,[9] and in its shrivelled state, in adults, does not lie close to the abdominal parietes, but depends loosely in a tolerably broad fold of the peritoneum.[10] The irregular course of the *pudenda communis* is also important, as its principal trunk, in some instances, does not descend between the inferior pelvic ligaments, but along the urinary bladder and prostate gland, or even through these to the penis, and may therefore, in the operation for the stone, be easily wounded in a dangerous manner.[11] Not less important in reference to the operation for crural rupture is the variety of the *obturatoria;* it arises, in rare cases, beneath the crural arch from the femoral artery itself, or very frequently from the *epigastrica*, or even by one trunk common to it and the latter from the pelvic artery;[12] in all these instances it returns upon the share-bone into the pelvis, and then passes usually on the outer side of the femoral rupture, although also in external femoral rupture on the inner side, and sometimes even curves in front of the neck of the sac. Finally, the course of the FEMORAL ARTERY and its branches is subject to numerous varieties, of which the most important are the following: the *epigastrica*, which normally, in external [oblique] inguinal rupture is on the inner side, and in internal [direct] inguinal rupture, on the contrary, is on the outer side of the neck of the sac, and in femoral rupture also ascends to its outer side, sometimes takes a contrary course, if it arise too low down from the femoral artery, or as is commonly the case with

the *obturatoria*, or although arising at its usual place, descends too low;[13] the *abdominalis* is sometimes double, and so large, that in wounds of the belly, injury to it is very dangerous;[14] the common FEMORAL ARTERY divides sometimes close to the crural arch, and in rare instances even above the crural arch into superficial and deep femoral arteries;[15] the latter is sometimes, as to size, the principal trunk, so that the perforating arteries of the thigh are unusually large; the internal CORONARY [CIRCUMFLEX] ARTERY arises sometimes so high, that in the operation for femoral rupture it may be wounded;[16] the SUPERFICIAL FEMORAL ARTERY in one instance gave off an uncommon branch, which descended on the inside of the lower extremity close beneath the skin to the inner condyle;[17] in other instances it was double to the tendon of the triceps, so that two trunks descended parallel to each other;[18] this leads to the unnatural high division into tibial and peroneal arteries,[19] from the POPLITEAL ARTERY a large branch which ascends to the middle of the thigh, and anastomoses with the perforating arteries;[20] lastly, the ARTERIES OF THE LEG also frequently vary, as the one or the other of them may be either entirely deficient or very small;[21] the division into the posterior, tibial, and peroneal arteries takes place very low down, there is irregular communication between them, or their course is unusual.[22]

(1) I have found this once; also *Tiedemann.* v. Zeitschrift f. Physiologie. Vol. I. Part I. p. 111, ff.—*Jacobson* v. *Meckel's* D. Archiv für Physiol. Vol. II. p. 134, and others, observed this.

(2) *Potthoff* D. s. descriptionem casus rariss. spinam bifidam, totalem, etc. exhibentis. 4to. Berol, 1827, p. 9, (but one artery instead of the cœliaca, mesenterica superior and inferior.) I have seen a similar case.—*Wehrde* D. anat. pathol. de monstro rariore humano. 8vo. Halæ, 1826, (the mesenterica superior, the sacra media, and the umbilicalis were wanting.)

(3) *Fleischmann*, v. Leichenöffnungen, p. 239, No. 81.—*Vic d'Azyr* once missed the communicating branch of the superior mesenteric artery. v. Mém. de Paris. Ann. 1776. Mém. p. 702.

(4) *Petsche* Syll. Obs. rec. in *Halleri* Col. Diss. Vol. VI. p. 781.

(5) I have found three times in newly born children that the artery is closed, but totally distinct from the vein. I have also found it in animals, viz. in a full grown otter and in a cavia aguti.—*Heusinger* found it in a full grown fœtus. v. Zeitschrift für organ Physik. Vol. I. Part III. p. 335.

(6) *Portal* Cours d'Anatomie médicale, Vol. III. p. 290.

(7) I have observed this once on the right and once on the left side. I have also seen an artery for the left deep seated kidney taking its origin from the right common iliac.

(8) Only a single umbilical artery, without any account to which side it belongs, is given in *Haller* Elem. Physiol. Vol. VII. p. 495.—*Hebenstreit* resp. *Lehmann* Funiculi umbilic. hum. pathol. Lips. 1747; and in *Haller's* Collect. anat. Vol. V. p. 682.—*Osiander* Annalen, Vol. II. p. 80.—*Murdoch* in Edinb. med. and surg. Journ. 1821, p. 315.—*Windsor*, *ib.* October, 1821.—*Rathke* in *Meckel's* D. Archiv. f. Physiol. Vol. VII. p. 483.—*Herrmann* in d. Salzburg. med. chir. Zeitung, 1822, Vol. IV. p. 93, ff.; the right missed by *Breschet*, v. Répertoire, etc. Vol. II. Cah. I. p. 471.—*J. F. Meckel* in five cases. v. Descript. mon-

stror. nonnullor. Lips. 1826, p. 13, 22, 31, 43; and in Archiv für Anat. und Physiol. 1826, No. 1, p. 37.—*Faber* D. duor. monstror. humanor. descript. anat. 4to. Berol. 1827, p. 16.—*Hesse* D. monstri bicipitis descript. anat. 8vo. Berol. 1823, p. 21.—*Bock* in *Cerutti's* Pathol. anat. Museum, Vol. I. Part III. p. 39.—*Mende* in Nov. Act. phys. med. Acad. Nat. Cur. Vol. XIII. Part II. 1827, p. 869; and myself in four cases. v. Selt. Beob. Part I, p. 16, and in No. 2903, 8012, and 8013, Bresl. Mus.; the left missed by *Wrisberg* Descr. anat. embryon. Obs. 4.—*Sandifort* Obs. anat. pathol. Lib. III. cap. 1, tab. 3, fig. 3, k.—*Carus* Zur Lehre von Schwangerschaft und Geburt. Part II. p. 107.—*Fränkel* D. de organor. generat. deformitate rariss. p. 14, 4to. Berol. 1825.—*Wehrde* D. anat. pathol. de monstro rariore humano, p. 12. Halæ, 1826.—*Mayer* in the Zeitschrift für Physiologie of *Tiedemann* and *G. R.* and *L. Ch. Treviranus*, Vol. II. Part I. p. 37; and myself in five cases, viz. in Monstror. sex humanor. anat. et phys. disquisitio, p. 15. 4to. Francof. 1811, and in No. 2881, 8011, 8015, and 8016, Bresl. Mus. I have also seen a case belonging here in the Anat. Mus. at Freyburgh. There appears also, in reference to the frequency of this phenomenon, no actual difference between the right and left sides. In rare cases both umbilical arteries are consolidated into one trunk within the cord. v. *Henkel* Medic. chir. Beobachtungen.—*Fleischmann* Leichenöffnungen, p. 239, No. 82.

(9) For instance, from the iliaca. v. *Breschet.*—From the aorta; this is indeed regular in the syren monsters. v. *Hottinger* in Misc. Nat. Cur. Dec. III. An. 9. Obs. 233.—*A. K. Boerhaave* Hist. anat. infantis cujus pars corporis inferior monstrosa. Petrop. 1754, p. 74; and Hist. altera Petrop. 1757, p. 73.—*Rossi* D. s. fœtus monstrosi Holmiæ nati descript. et delineat. Jenæ, 1800, p. 16.—*Sachse* D. s. descriptionem infantis monstrosi. Lips. 1803, p. 14.—*Dieckerhoff* D. de Monopodia. Halæ, 1819 (in several cases.)—*Hesselbach* Beschreibung der pathol. Präparate zu Würzburg, p. 232.—*Behn* D. de monopodibus, p. 12. 4to. Berol. 1827.—Myself. v. Monstror. sex humanor. anat. et physiol. Disquis. p. 38, and in No. 2903 of my Verzeichniss.—This anomaly, however, also occurs without syren formation. v. *Needham* De format. fœtu. Cap. IV.—*Kerkring* Spicil. anat. Obs. 9, p. 27.—My Selt. Beob. Part I. p. 16.—*Herrmann* in d. Salzb. medic. chir. Zeitung, 1822, Vol. IV. p. 95.—In a monstrous calf, with deficient hind-part of the body, the umbilical arteries arose from the anterior mesenteric. v. *Fingerhuth* in *Meckel's* Archiv für Anat. und Physiol. 1826. No. 1. p. 3.

(10) I have observed this twice; *Kelch* also has seen it once. v. Beiträge zur pathol. anat. p. 60, No. 47.—There may easily arise from this anomaly an internal contraction of the intestine.

(11) This variety is so common, that *Vesalius*, and other older writers, have considered it as the usual formation. I have, however, observed it but twice in adult men. *Burns*, p. 350, first pointed out the danger of wounding it in the operation for the stone in man.—*Tiedemann* Tabulæ Arteriar. tab. 30, fig. 2, has engraved it very satisfactorily.—On account of this anomaly, *J. Shaw* lost a patient by hemorrhage, very shortly after operating for the stone. v. Magazin der ausländ litterat. der ges. Heilkunde, Vol. XI. p. 349.—Seldom, and perhaps only in injuries of the penis, is the origin of the arteria dorsalis penis from the deep artery of the thigh important. v. *Tiedemann*, tab. 3, fig. 1.

(12) I have several times found the varieties just mentioned, and it appears to me, as also to *Hesselbach* and *Tiedemann*, that the external origin of the obturatoria in women is more frequent than in men. Good plates of these varieties are given by *Monro* in his Morbid Anatomy of the human Gullet, Stomach, and Intestines. Edinb. 1811, Tab. 14.—*Burns* in Edinb. med. and surg. Journ. Vol. II. p. 273, fig. 1.—*Wardrop, ib.* p. 203.—*A. K. Hesselbach* Ueber den Ursprung und Verlauf der untern Bauchdeckenschlagader und der Hüftbeinlochsschlagader. 4to. Bamberg and Würzb. 1819, with six plates.—*Tiedemann* Tabulæ Arteriar. tab. 30, fig. 3 and 4; tab. 33, fig. 2—4.

(13) Such cases are described by *F. C. Hesselbach* in der Salzb. med. chir. Zeitung, 1811, No. 62, p. 186; and in Untersuchung über den Ursprung und das Fortschreiten der Leisten-und Schenkelbrüche, p. 17. Würzburg, 1815.—*Burns*, p. 360.—*Beckers* D. med. de hernia inguinali, p. 316. Paris, 1813.—*A. K. Hesselbach*, p. 24, No. 31.

(14) *Ramsay* in Edinb. med. and surg. Journ. Vol. VIII. p. 282, plate 1, fig. 1.—*Burns*, p. 361.

(15) The ligature of the superficial femoral artery for aneurysm was without any good result, because the deep artery arose almost immediately below the crural arch; and, therefore, between its origin, and the part at which the ligature was applied, so small a space remained, that the clot could not withstand the flow of the blood. v. Ephém. médic. de Montpellier, Vol. V. p. 61.—A few good engravings of high division are given by *Tiedemann*, tab. 33, fig. 2 and 3.—The division above the crural arch was observed by *Burns*, p. 362, in four individuals. — *Tiedemann* once. v. Explicat. Tabular. Arteriar. p. 322, note a.—I have found it twice, and, indeed, on both sides in each case; the high division near the crural arch I have not unfrequently seen.

(16) *Burns*, p. 362.

(17) *Zagorsky*, Vol. I. observed this case, interesting physiologically, on account of the similarity between the arteries and veins of this region.

(18) *C. Bell* in London med. and physical Journal, August, 1826.—As in this case the man had popliteal aneurysm, the blood, after the ligature had been applied, naturally passed by one femoral artery into the sac.—A similar variety was found by *Houston*. v. Dublin Hospital Reports and Communications. Vol. IV. p. 314.

(19) According to *Ramsay*, p. 283, the division takes place sometimes above the popliteal muscle, so that of these, the anterior tibial artery proceeding from it, inclines towards the tibia; in rare cases the division is found as high as the crural arch. v. *Sandifort*, Obs. Anat. pathol. Lib. IV. p. 97. — *Portal* Cours d'Anatomie Medicale, Vol. III. p. 326.

(20) My Selt. Beob. Part II. p. 62.

(21) According to my observations, this most frequently occurs in the peroneal. I have, however, now and then missed the anterior tibial, in which case the dorsal artery of the foot is formed by the anterior peroneal. I have never myself seen the posterior tibial deficient.

(22) In one man the anterior tibial lay so superficially, that its pulsation excited a suspicion of aneurysm; in one of his children an early similar anomaly was observed. v. *Pelletan* Clinique Chirurgicale, Vol. I. p. 101.

§ 191.

The course of one or several arteries is occasionally so far irregular that they appear unnaturally CURVED and TORTUOUS. In many instances this seems to be congenital,[1] more frequently acquired, as in incurvation of the skeleton the neighbouring arteries participate in this change;[2] or tumours, dislocated bones, &c. sometimes displace the neighbouring blood-vessels; or the arteries in disease of their coats, and consequent diminished elasticity, become gradually elongated by the stream of blood, and therefore curved.[3] Great difference also exists in reference to the THICKNESS of the arterial parietes; thus frequently they are throughout the whole body congenitally too THIN, and resemble veins,[4] or this occurs only in certain parts;[5] lastly, the arterial membranes are sometimes remarkably thinned at a later period, owing to great extension and atrophy.[6] Very frequently also, on the contrary, the arteries become THICKENED by disease.

(1) Thus the carotids were once found twisted in the middle like a snail's shell. v. *Morgagni*, Epist. XLIX. 18; perhaps, also the remarkable serpentine course of the iliac artery, which I have described, was congenital.—Compare

my Selt. Beob. Part II. p. 63; that both cases are important in operative surgery requires no further discussion.

(2) For example, in rickety distortion of the lower extremities; the vertebral artery in spondylarthrocacy of the first cervical vertebra; the subclavian in unsymmetry of the shoulders; but especially the aorta in kyphosis and scoliosis of the spine below the fifth dorsal vertebra.—*A. L. C. Wetzel* præs. *Hartmann* Efficacium gibbositatis in mutandis vasorum directionibus. 4to. Traj. ad Viadr. 1778, with four engravings. — *Vrolik* D. anat. pathol. de mutato vasorum sanguiferor. cursu in scoliosi et cyphosi. 4to. Amstel. 1823, with two plates.– My Verzeichn. No. 3932—3935.—In badly united and distorted fractures of the long tubular bones, I have seen the vascular trunk of the extremity very much curved.

(3) I have also seen this several times, once in the greatest degree in the aorta, which was bent at a right angle, and was displaced almost two inches to the left. Compare my Selt. Beob. Part II. p. 64, and my Verzeichniss, No. 3936. —A similar extension of the iliac arteries and aorta was observed by *Morgagni.* v. Epist. XIX. p. 58; XXXVII. 30; also in the carotid and vertebral arteries, XLII, 34; LXVII. 11.

(4) *Abernethy* thus found the aorta and pulmonary artery in a blue child. v. his Surgical and Physiological Essays.—I have also seen a similar state in some monsters.

(5) For instance, the carotids and vertebral arteries within the cavity of the skull in acephaly, hydrencephaly, and congenital water in the head; further, the arteries of many spurious growths, particularly the common and medullary sarcom.

(6) For instance, in limbs which have been paralytic for a long while.

§ 192.

The variation of arteries as to their normal CALIBRE is found in both directions. First, as to their IRREGULAR NARROWNESS, or smallness, this may be equally congenital as acquired, general or local, and may lead to the complete closing up and imperviousness of the vessels. We find it indeed occurring throughout the whole arterial system in relation to the heart, or with it in reference to the whole body remarkably narrow, as was once observed in the trunk of the aorta.[1] In persons affected with the blue disease, the pulmonary artery is often too narrow or even closed.[2] In limbs which have been long paralytic, the arteries are now and then too narrow, as also usually the other wasted, hardened, or even inactive organs, as well also as the arteries below an aneurysmal tumour. Sometimes we observe only on certain spots a great narrowing and even imperviousness of the arteries, without being able to determine, whether it be vice of formation, or the consequence of disease and mechanical influence; this happens not unfrequently in the smaller arteries;[3] it has been observed several times even in the aorta.[4] In other cases the cause of the narrowing or closing of certain arteries is foreign to the vessel itself; thus, for instance, when they are compressed by tumours in their neighbourhood,[5] or their proper coats are rendered less transparent by thickening,[6] or lastly, when they are clogged up by cancerous matter,[7] &c.

(1) *Morgagni*, Epist. XVIII, p. 2; XXI. 36; XXIII. 4; XXX. 12; XXXVIII. 34; XLV. 23; LIV. 37; LV. 10; LVI. 10; LXVI. 8.—*Meckel* Mémoires de Berlin, 1750, p. 163—182; 1756, Obs. 17, p. 61.—I have myself found several such cases in leucophlegmatic persons. In a large man I once saw all the arteries not larger than those of a boy twelve years old, at the same time the heart was very small.

(2) Compare § 174, note, and § 186, note 14 and 15.

(3) *Fleischmann* found the aorta with its branches, from the diaphragm downwards, very narrow, v. Leichenöffnungen, p. 226, No. 71.—On spontaneous closure of the arteries, compare *Chaussier* in Bulletin de la Fac. de Méd. et de la Soc. de Paris, 1818, p. 149.—A remarkable case of spontaneous closure of the right art. brachialis, ulnaris, cruralis, poplitea, and tibialis, after severe cold, was observed by *Thomson*. v. *Hodgson*, On diseases of Arteries, &c.—Closure of the carotids, seen by *Petit*. v. Mém. de l'Acad. des. Sc. 1765, p. 758.—*Pelletan* Clinique chirurgicale, Vol. I. p. 68.—*A. Cooper* in Med. chir. Transact. Vol. I. p. 12, tab. 2, fig. 2. — The subclavia and axillaris, *Pelletan*, p. 77, 80.—*Beauchene* in Journ. de Méd. Vol. XX. p. 209. — *Hodgson*, p. 156.— The brachial artery from its orgin to its division. v. *Ribes* in Bullet. de la Faculté de Méd. de Paris, 1817, No. 1—4.—*Rostan* in *Sédlilot's* Recueil période. Vol. LXIV. p. 242. —The external iliac, *Bryant* in Edinb. Med. and Surg. Journ. Jan. 1823—The popliteal, *Ribes*.—The anterior tibial in the region of the ankle. v. *J. Barclay*, A description of the arteries of the Human Body. p. 263. 8vo. Edinb. 1812.

(4) A very narrow part was found by *Paris*. v. *Dessault's* Journ. de Chir. Vol. II. p. 107, (close under the arch of the aorta.)—*A. Cooper*, Surgical Essays, Part I. p. 115, (close under the arch of the aorta, death by bursting of the heart.) —My Selt. Beob. Part II. p. 66, tab. 1, fig. 3, (close beneath the arch, death from rupture of the aorta.)—Complete closure of the aorta was noticed by *Graham*, and communicated by *Blane* in Med. chir. Trans. Vol. V. p. 287, (in the region of the canalis arteriosus.)—*Goodisson's* case of obliterated aorta, with some additional remarks by *Crampton* in Dublin Hospital Reports, &c. Vol. II. p. 194, (below the inferior mesenteric artery.)—*A. Monro*. v. *Johnson* Med. chir. Review, new series, No. 12, p. 481, April, 1827, (the abdominal aorta below an aneurysm.)—*A. Meckel* in *J. F. Meckel's* Archiv für Anat. und Physiol. 1827, No. 3, p. 345, pl. 5, fig. 1 and 2, (on the fourth dorsal vertebra.)—[Left carotid at its origin from the aorta so narrowed by a membrane as scarcely to admit a probe, in a patient of *Key's* who had aneurysm of the innominata, for which the carotid was tied; she died an hour and a half after the operation. v. Med. Gazette, Vol. VI. p. 702.—The pulmonary artery contracted to the size of the brachial. v. *Elliotson*, p. 19. T.]

(5) For example, bronchocele the carotids, aneurysm the neighbouring arteries; compare *Pellatan*, *A. Cooper*, *Hodgson*, note 3. — In one case, two steomatous tumours enclosed the aorta close under its arch. v. *Stenzel* D. de Steatomatibus in principio arteriæ aortæ repertis. Viteb. 1723.—I have several times seen individual arteries closely compressed by scrofulous, scirrhous, and encysted tumours. v. Verzeichn. No. 2265.

(6) Compare further below, in vices of texture; and my Verzeichn. No. 2266 and 2267.— In the late Margrave of Baden-Baden, almost the whole aorta was filled with lime. v. *J. P. Frank* Apit. de cur. hom. morbis, Vol. VIII. L. VI. p. 331.

(7) *Velpeau* Exposition d'un cas remarquable de la maladie cancereuse avec obliteration de l'Aorte, etc. 8vo. Paris, 1825.—In a person with carcinomatous disposition, the aorta was filled from the third lumbar vertebra downwards, and also the iliac arteries partially, with a firm cylinder of a greyish yellow colour. v. *Churchill*, in Lond. Med. and Phys. Journ. new series, Vol. II. No. 9, March, 1827.

§ 193.

The opposite state, that is, A PERMANENT IRREGULAR WIDENING, OR GREAT SIZE OF ARTERIES, is much more common, and exhibits likewise many variations of grade and

extent. It occurs in individuals in whom the whole arterial system is congenitally very large in proportion to the body; but this enlargement of arteries is commonly more defined and occurring at a later period, in which we distinguish the DILATATION OF ARTERIES, *dilatatio, distensio arteriarum, arteriectasis*, and ANEURYSM, *aneurysma*, although without being always able to distinguish them accurately from each other. To the former kind belongs the general enlargement, affecting the diameter of one or several arteries, as it appears sometimes in hypertrophy of certain parts, but especially in many tumours, and most distinctly in neighbouring branches after the closing up or narrowing of the principal trunk;[1] in these cases the coats of the artery are healthy, and the dilatation of the vessel appears to be spontaneous and active. Another, is the passive or morbid form, in which, according to the more or less abnormal change of its structure, or diminished coherence, the artery loses its necessary elasticity, and so, being incapable of opposing the violent passage of the blood, is often very distinctly expanded, in a greater or less degree; the latter state especially occurs in diseases of the lungs, in the trunk of the pulmonary artery, but more frequently at the origin of the aorta.[2] A peculiar form of disease, not however yet, according to its nature, fully investigated, but which still must be classed with these, is the EXTENSION OF THE EXTREMITIES OF THE ARTERIES, *telangiectasis, angiectasis, aneurysma per anastomosin, hæmatoncus, tumeurs erectiles*,[3] &c. This is usually congenital, in form of a mother's mark, more or less large, elevated and reddish, which earlier or later begins to increase and develope itself, and indeed sometimes only after a long period, and even then but slightly; in rarer cases, however, this disease appears to take place later, spontaneously, or from some mechanical cause. It especially attacks the skin of the head, although also in rare cases it affects other parts of the skin, and perhaps even the interior of the body itself,[4] and produces tumours of various size and form, which are easily dispersed by pressure, but when that is withdrawn, again become filled; often have a tremulous motion, accompanied with an internal rushing, a bluish-red colour, and an unequal surface; at a later period much blood is repeatedly poured out from the most projecting parts having burst, and from anatomical examination, they are found to consist of a vast quantity of the extreme branches of arteries, collected on all sides, expanded, anastomosing, and disposed in a net-like and coil-like manner, of many veins expanded here and there into cavities, and of a loose cellular tissue.

(1) Some striking examples of this kind are given in *White*, Cases in Surgery, p. 139, tab. 7. Lond. 1770, (on the arm.) — *Deschamp* in Mém. prés. à l'Institut. des Sciences, 1805, Vol. I. p. 251, (on the foot.)—*Pelletan* Clinique chirurgicale, Vol. I. p. 127, (on the foot.) — *A. Cooper* in Medico-chir. Transact. Vol. II. p. 249, and Vol. IV. p. 429. pl. 5, (on the feet.)—*Jones*, On the process employed by nature in suppressing the hemorrhage from divided and punctured arteries, &c. 8vo. London, 1810, (experiments on dogs.) The same occurs after closure of the aorta. — In the Anatom. Mus. at St. Thomas's Hospital, I saw some very rare preparations of collateral circulation.—In one instance, in which the truncus anonymus was closed, the right arm received its blood from the left subclavia, by the much widened communicating inferior thyreoideal arteries. v. *William Darrach*, in Philadelphia Journal.—Often in varicose aneurysms, the arteries which are narrowed above, become widened below the injured part. v. *W. Hunter*, Vol. II.—*Dorsey* and *Schottin*, &c. § 194, note 6.

(2) On both places I have found it several times very distinctly, and on the aorta also sometimes unequally, that is, slightly bottle-shaped; compare my Verzeichn. No. 2250—2253.

(3) In the venereal disease, also cavernous, spongy, bloody fungous tumours, &c. The disease was first satisfactorily described by *John Bell*, under the name of *Aneurysma per anastomosin.* v. Principles of Surgery, Vol. I. p. 456; Vol. III. p. 255.—*Gräfe* Angiectasie, ein Beiträg. zur rationellen Cur. und Erkenntniss der Gefässausdehnungen. 4to. Leipz. 1808, with plates. — *Alibert* calls this disease *Hæmatoncus;* and distinguishes three kinds:—H. fungoides, H. frambæsia, and H. tuberosus. v. Nosologie naturelle, Vol. I. p. 334. — *v. Walther* in his and *v. Gräfe's* Journ. d. Chir. Vol. V. Part II. p. 231, (five instances on the head, a sixth on the labia pudendi.) — Some interesting cases are described by *Desault* in Journ. de Chir. Vol. II. p. 73, (on the chin.) — *Lamorier* in Mém. de la Société de Montpellier, Vol. I. p. 245, (on the arm.)—*Scarpa* Sull' aneurysma, (in the left arm-pit.)—*Pelletan*, Vol. I. and Vol. II. p. 59, (on the head.)—*Travers* in Medico-chir. Transact. Vol. II. p. 1, (in the orbit.) — *Dalrymple*, *ib.* Vol. VI. p. 110, (in the orbit.)—*Abernethy*, Surgical Observations, p. 224, (besides several cases on the head, one also in the orbit.)—*Boyer*, Traité des maladies chir. Vol. II. p. 269, (in the orbit.)—*Tartra* s. *Harles* N. Journ. der ausländ. med. chir. Litt. Vol. VII. Part I. (on the head.)—*Wardrop* Obs. on one species of nævus, in Med. chir. Transact. Vol. IX. p. 203, ff, (several of his own cases, also a case by *Lawrence*, p. 216, on the finger.)—*Breschet* gives a case of a large telangiectasy on the occiput and neck of a grown-up person, in the Dict. des Sciences médicales, Vol. XX. p. 200. Art. Hæmatoncie. — *G. S. Pattison*, in American medical Recorder, New-York, Jan. 1822, Art. 11, (on the face, cured by tying the carotid.) — *Arendt* in Journ. f. Militair-Medicin. 8vo. Vol. I. Part I. p. 75—88. Petersb. 1823, with engravings, (on the right side of the head, cured by tying the carotid.)—*Büchner* in *Harles* Rhein. Westphäl. Jahrb. de Medic. u. Chir. Vol. VIII. Part II. p. 123, with plates, (on the forehead of a child.)—*Brosse* in *Rust's* Magazin der ges. Heilk. Vol. VII. Part II. p. 161, (on the right ear and the surrounding parts, cured by tying the carotid.)—*Hodgson*, p. 86, (on the temple.)—*Ib.* translated into French by *Breschet*, with several observations by *Dupuytren.*—*Kreysig* observed a case on the point of the fore-finger. v. *Hodgson*, p. 97, note 13.—*Burns*, Anatomy of the Head and Neck, p. 309, 8vo. Edinb. 1811, tab. 8, fig. 1, (on the face.) — *Weese* in *Rust's* Magazin f. die ges Heilk. Vol. XII. Part II. p. 227, (on the lower eye-lid.)—I once saw a very remarkable case in a stout countryman on the right side of the face and neck.—[Aneurysm by anastomosis occupying the middle of the upper lip, the whole nose, and lower part of the forehead, cured by ligature. v. *Liston* in Med. Gaz. Vol. VI. p. 896. — Anastomosing aneurysm extending across the nose from canthus to canthus, covering the nose to its extremity and reaching on the forehead, in a child three months old, the common carotid tied by *Mott.* Amer. Journ. of Med. Sc. —Anastomosing aneurysm on the head, with a base of five inches diameter, and elevation of nearly two inches, cured by tying both primitive carotids. v. *R. D. Mussey* in American Journ. of Med. Sc. Feb. 1830. T.]

(4) I have my doubts whether the cases described by *Meckel* in Handb. der

pathol. anat. Vol. II. Part I. p. 244, were true telangiectases; the pulsating spleen, indeed, of writers is for the most part inflamed spleen, and the similar diseases occurring in the brain and liver, are, indeed, fungus hæmatodes, that is, a kind of medullary sarcoma; lastly, the pulsating tumour described by Bell, p. 471, as large as an egg, and situated between the vagina and rectum, is not, from the description, to be received with certainty.

§ 194.

ANEURYSM, *aneurysma*,[1] is an arterial swelling, proportionally more distinct, more perfectly defined, and especially affecting but one side of the arterial trunk.[2] We generally speak of the following kinds of aneurysm: first, the TRUE OR GENUINE, *aneurysma verum, genuinum*,[3] which consists of a more or less distinctly sac-like extension of all the coats of an always diseased artery; secondly, the MIXED ANEURYSM, *aneurysma mixtum*,[4] in which the genuine and spurious are confounded together, and arises from a mechanical or morbid destruction of the two inner coats of the artery, with sac-like expansion of the outer or cellular coat, as well also as of the adjacent cellular tissue, and sometimes also of the other membranes investing the artery; the third, is the FALSE OR SPURIOUS ANEURYSM, *aneurysma spurium*,[5] the essence of which is grounded in an aperture in all the membranes of an artery, and the production of a swelling, more or less extensive, from the effusion of blood into the neighbouring cellular tissue, and on the limbs into the tendinous sheaths; lastly, and fourthly, the VARICOSE ANEURYSM, *aneurysma varicosum*, or *varix aneurysmaticus*,[6] in which, in consequence of wound and the production of a communication between the artery and vein, the blood from the former flows into the latter, and produces a swelling in it. We also distinguish them according to their situation, as EXTERNAL and INTERNAL ANEURYSM, *aneurysma externum* and *internum*, and thus we commonly designate by the former title those situated on the limbs, which are also the most visible; and by the latter name, those which are mostly occult on the trunk.

(1) *J. B. Sylvaticus*, Tract. de aneurysmate. 4to. Vincent. 1595.—*v. Haller's* Bibl. med. pract. Vol. II. p. 245.—*van Horne* Epist. de aneurysmate. 8vo. Panormi, 1644.—*A. Politius* Apologia de aneurysmate prætenso, etc. 4to. Panormi, 1620.—*Th. Bartholinus* De aneur. 4to. L. B. 1641.—*Wepfer* D. περι ανευρυσματος. Basil. 1659.—*G. A. Fabricius* D. de A. Basil. 1667.—*Metzger* D. de A. Tubing. 1679.—*Wedel* D. de A. Jenæ, 1669.—*Klose* D. de tumore aneurysmatico. Leips. 1702.—*Alberti* D. de A. Halæ, 1725.—*Lancisius* De aneurysmatibus. Romæ, 1728, in *Lauth's* Collect.—*Hilscher* D. de A. Jenæ, 1728.—*F. Nicholls*, Some observations on aneurysms in general, in Philos. Transact. 1728, p. 440.—*J. L. Petit* in Mém. de Paris, 1736. Mém. p. 244.—*A. F. Walther* Pr. de A. Lips. 1738.—*van Lieuwen* D. de A. vero. Leidæ, 1742.—*Guattani* Historiæ duæ aneurysmatum, etc. Romæ, 1745, and De externis aneurysmat. Romæ, 1772. v. *Lauth's* Collect.—*H. Petiot* de A. in Quæstion. med. XII. Monsp. 1749.—*Weltinus* D. de aneur. vero pectoris externo, hemi-

plegiæ sobole. Basil. 1750. v. *Lauth's* Collect. — *Arnauld,* Observations on aneurysms. London, 1750.—*Matani* Animadversiones de aneurysmat. præcordiorum morbis, etc. Florent. 1756. v. *Lauth's* Collect.—*Foubert* in Mémoires de l'Academie de Chir. de Paris. Vol. II. p. 535.—*Gibellet* D. de A. Argentor. 1757.—*Alex. Monro,* Remarks on the coats of arteries, their diseases, and particularly on the formation of an aneurysm, in Edinb. Medic. Essays and Observat. Vol. II. p. 264.—*Donald Monro,* Cases of aneurysms, with remarks, in Edinb. Med. Essays and Observat. Vol. III. 1771. No. XII. p. 187.—*Asmann* D. de aneurysmatibus. Grœning, 1773. v. *Lauth's* Collect.—*Verbrugge* D. anat. chir. de A.; oblata notabile aortæ aneurysma divulgandi occasione. L. B. 1773. v. *Lauth's* Collect.—*J. B. Heraud* De aneur. externis. Monsp. 1775.—*W. Hunter,* The history of an aneurysm of the aorta, with some remarks on aneurysms in general, in London Medic. Observ. and Inquiries. Vol. I. 1776. p. 323. Pl. IV. fig. 1. Vol. II. p. 390.—*Stribel* D. de A. Viennæ, 1783.—*Th. Lauth* Scriptor. latinor. de aneurysmatibus Collectio. 4to. Argentor. 1785, with 15 engravings.—*Penchienati* Recherches anat. pathol. sur les aneurysmes, etc., in Mém. de l'Acad. de Turin, 1784-85. Part I. p. 153.—*Walter* Sur l'aneurysme in N. Mém. de Berl. 1785, p. 48. — *C. Lombardini* De aneurysmat. præcordior. morbis. 4to. Ticini, 1787.—*Witte* D. de A. ejusque curatione. Kilon, 1787. — *Laue* D. de arteriar. morbis et præcipue de aneurysmatibus. L. B. 1787.—*Scheid* Obs. med. chir. de A. 8vo. Harderovici, 1792. — *E. Home,* Account of Mr. Hunter's method of performing the operation for the cure of the popliteal aneurysm in Transactions of a Society for the Improvement of medical chir. Knowledge, Vol. I. p. 138, Vol. II. p. 235. 1793 and 1800.—*Salmade* in *Sédillot* Recueil périod. de la Société de Santé de Paris. Vol. III. p. 454.—*Palletta* in Giornale di Venezia, 1796, No. 1, p. 24; and in *Kühn's* and *Weigel's* Ital. medic. chir. Biblioth. Vol. IV. p. 73.—*R. Calliot* Essay sur l'Aneurysme. 8vo. Paris. Ann. VIII.—*Ayer* Ueber die Pulsadergeschwülste und ihre chirurg. Behandlung. 8vo. Götting. 1800, with plates.—*Sarazin* Considérations sur les causes générales de l'Aneurysme et de la rupture spontane des vaisseaux sanguins arteriels, etc. Paris, 1800.—*Benedix* D. A. externum ejusque curatio. Jenæ, 1801.—*Briot* Essai sur les tumeurs par le sang arteriel. 8vo. Paris, 1802.—*Guerin* Mémoire sur l'Aneurysme in Rec. des Actes de la Soc. de Santé de Lyon. Vol. II. p. 149, 176.—*Maunoir* Mémoires physiologiques et pratiques sur l'Aneurysme et la ligature des artères. Genève, 1802.—*Richerand* Observations sur une nouvelle espèce d'Aneurysme in Bulletin de la Soc. Philomath. Ann. III. Vol. II. p. 48.—*Larrey* Notice sur l'Aneurysme in Bulletin de l'Ecole de Méd. et de la Soc. de Paris, Ann. XIII. p. 116.—*Dingeman's* Verhandeling over de waare en onwaare Slagaderbreuken. 8vo. Amsterd. 1803.—*A. Scarpa* Sull' Aneurysma, riflessioni ed osservazioni anatomico-chirurgiche. gr. fol. Pavia, 1804, with plates; with notes and additions, translated into German by *Harles.* Zürich, 1808. Text in 4to., with fol. plates, into French, by *Delpech.* Paris, 1809. —Sammlung einiger Abhandlungen von *Scarpa, v. Berlinghieri* und *Uccelli* Ueber die Pulsadergeschwulste, als Nachtrag zu *Harles's* Uebersetzung von *Scarpa's* Werke a. d. Ital. mit Zutsätzen von *W. B. Seiler.* 8vo. Zurich, 1822. — *Akerman* resp. *Ahlander* Observationes in Aneurysmata D. Upsal. 4to. 1804— *Deguise* D. sur l'Aneurysme, etc. Paris, 1804.—*Popp* D. selectiora capita de Aneurysmatibus. Altdorf, 1805.—*Ludwig* Progr. Annot. diagnostices chirurgicæ fragmenta, I. de aneurysmate interno. Lips. 1805.—*C. Fr. Hübner* D. de Aneurysmatibus. Göett. 1807.—*Freer,* Observations on Aneurysm and some diseases of the arterial system. 4to. Birmingham, 1807.—*Ingelmann* præs. *Engelhart* D. Aneurysma spurium externum, casu hujus morbi illustratum. 4to. Lund, 1814.—*Jacob* D. de A. Edinb. 1814.—*Aitkin* D. de. A. Edinb. 1814.—*Szwenski* D. de aneurysmatis structura. Halæ, 1814, with two engravings.—*J. Hübner* D. de Aneurysmatibus. Viennæ, 1815.—*J. Hodgson,* Treatise on the diseases of Arteries and Veins, containing the pathology and treatment of Aneurysms and wounded Arteries. 8vo. Lond. 1815, with plates.—*G. A. Spangenberg* Erfahrungen über die Pulsadergeschwülste, in *Horn's* Archiv f. d. medic. Erfahrung. 1815, p. 209.—*C. D. Kühln* D. de A. externo. 4to. Jenæ, 1816.—*Hurst* D. de A. Edinb. 1817.—*Herrick* D. de A. Edinb. 1817.—*Frampton* D. de A. Edinb.

1819.—*Huston* D. de A. Edinb. 1819.—*Manzoni* in Memorie della Soc. Ital. di Modena. Vol. XVIII. Mem. di Fisica. No. 12.—*A. J. Münzenthaler* præs. *Münz.* D. s. Observationes et annotationes quasdam de aneurysmatibus et præc. veris. 4to. Landishut, 1820, with two plates.—*Beathy* D. de A. Edinb. 1820.—*Chevallier* D. Aneurysmatum adumbratio anat. pathol. 8vo. Berol. 1821.—*Döring* D. quædam circa Aneurysmatum pathogeniam. 8vo. Berol. 1822.—*Townsend* D. de A. Edinb. 1822.—*J. Shekelton* in Dublin Hospital Reports and Communications, 1822, Vol. III.—*Boysen* D. de Aneurysmatibus. 4to. Kiliæ, 1822.—*Gottschalk* D. doctrinam hodiernam de aneurysmate exhibente. Trajecti ad Rhen. 1822.—*M. S. Levi* Saggio teortico-pratico sugli aneurismi interni, etc. 8vo. Venezia, 1822.—*Wedemeyer* in *Rust's* Magazin für die gesammte Heilkunde, Vol. XIII. Part II. p. 229.—*Pascalis* in New-York medical Repository, Vol. VII. No. 1.—*Casamayor* Reflexions et Observations anat. chir. sur l'aneurysme spontané en general et sur celui de l'artère femorale en particulier. 8vo. Paris, 1825.—*J. S. Morizio* D. de Aneurysmatibus internis. 8vo. Patavii, 1825.—*Fr. Schippang* D. de Aneurysmate in genere. 8vo. Berol. 1826.—*Desmann* D. de incerta aneurysmatum internorum diagnosi. 4to. Berol. 1827, with lithogr. plates.—*G. Breschet* Recherches et Observations sur l'Aneurysme faux consecutif du cœur et sur l'Aneurysme vrai des artères in Répertoire génér. d'Anatomie et de Physiol. pathol. Paris, 1827, Vol. III. Part II. p. 183.—*Dupuytren* Mémoire sur les aneurysmes, qui compliquent les fractures et les plaies d'armes à feu in Archives générales de Médecine, Juillet, 1828.

(2) In order to obviate the confusion relating to arteriectasy and aneurysm, it seems to me necessary to confine the partial and bag-like extension to the latter, but the general and simultaneous to the former. The so-called aneurysma verum cylindroides of *Sauvages* may, however, and with propriety, be called merely an extension of the vessels sensu latiori, in which notion *Scarpa* includes only one particular kind of aneurysm.

(3) The first opinion held by *Fernelius*, Universa Medicina, de extern. corp. affect. L. VII. cap. 3, that *all* aneurysms arose from expansion of the whole arterial coats, only holds good in certain cases, which *Scarpa* denies without sufficient grounds. Many cases of true aneurysms have been collected by *Harles*, in his translation of *Scarpa*, p. 310, ff.—*J. F. Meckel* in Tab. anat. pathol. Fasc. II. p. 10; and *Hodgson*, p. 94, ff.—I myself have, up to this time, examined five aneurysms, in which all three coats of the artery were uninjured, but expanded, and I have already mentioned them, v. Handbuch der pathol. anat. 1st edit. p. 105. note 42. Selt Beob. Part I. p. 103; Part II. p. 65. It is self-evident, that the true aneurysms, especially on the aorta, seldom become so large as the mixed and spurious aneurysms, and easily run into the latter. In true aneurysm, the extension of the artery, arteriectasis, usually occurs in all parts of the vessel, and subsequently the artery begins to expand at its weakest part, in a bag-like form, so that we may notice a gradual transition, and endless steps, from arteriectasis to true, mixed, and spurious aneurysm.—*Anton Nuck*, Operat. et experim. chirurg. L. B. 1696, p. 97, appears to have been the first who gave an account of the correct differences between true and spurious aneurysm. [In the Mus. St. Thomas's Hospital there are two instances of aneurysm by simple dilatation of the aorta, and two of the carotid artery. T.]

(4) *W. Hunter* first employed this term as synonymous with *Aneurysma herniam arteriæ sistens*, and showed the diverticulum, or bellying protrusion of the inner coat through an aperture in the outer; as this circumstance, however, according to the experiments of *John Hunter* and *E. Home*, does not always occur in the above state, and the few observations thereon by *Dubois* and *Dupuytren*, in the Dict. des Sc. Méd. art. Aneurisme; and *Breschet*, in his translation of *Hodgson*, p. 130; *Richerand* Aneurysma aortæ enorme per herniam membranæ internæ, in his Nosogr. Chirurg. Vol. I. p. 74, 1805; and Asklepieion, 1811, No. 71, do not hold it to be sufficiently made out; this distinction is therefore given up by most persons.—*Alex. Monro* called a true aneurysm which had burst, mixed or consecutive.—*Verbrugge*, p. 15. § 7, makes use of the terms A. varicosum and A. mixtum indiscriminately.—*Morgagni*, in his Advers. Anat. II. Animadversiones, XXXIX. and Epist. Anat. XVII. 27, calls common or mixed aneurysm the *sacciforme*,

which title, however, suits true aneurysm.—*Scarpa* includes A. mixtum with the spurium, because he only admits two arterial coats, and has taken great trouble to make out the frequency and true nature of this species especially, although *Harvey*, Exercit. Anat. de circul. sanguinis, ex editione *Albini*, L. B. 1736, Preface, p. xiv. and cxxix. &c. had already defined it. The aneurysmal sac is commonly connected with the artery by means of a round, and, more or less, large aperture; rarely is this aperture a kind of oblique or ragged slit.

(5) It is known that *Galen*, *Aetius*, *Fabricius*, *Hildanus*, *Sennert*, *Sylvaticus*, *Diemerbroech*, and more recently, especially *Palletta*, *Scarpa*, and *Burns*, derive all aneurysms from rupture of the arterial coats.—*W. Hunter* divides A. spurium into the *diffusum* and *circumscriptum*.—*Foubert*, on the contrary, less correctly, divides them into *A. primitif*, answering to the diffusum; and *A. consecutif*, to the circumscriptum; the latter contains the blood in a bag, not belonging to the artery, formed by coagulation and inflammation; in *A. diffusum*, on the contrary, the blood is poured out loosely into the cellular tissue, and the aponeurotic sheaths; both kinds may occur, as is easily perceived, may go through their stages together, or may run into one another. [In Mus. St. Thomas's Hospital a case of spurious aneurysm of the femoral artery from a bayonet wound. There is no attempt at repairing the wound, but around the orifice a sac as large as a hen's egg, consisting of layers of coagulum; and close to the artery an aperture, through which the blood escaped into the cellular tissue of the thigh, which was enormously swollen. T.]

(6) *W. Hunter*, who first described the disease, called it *aneurysma per anastomosin;* subsequent observations upon it may be found in *Guattani*, Obs. 2 and 4.—*Cleghorn*, Case of aneurysmal varix in Med. Observat. and Inquiries, Vol. III. No. 13, p. 110.—*White*, On the varicose aneurysm, *ib.* Vol. IV. No. 34.—*Armiger*, On varicose aneurysm. *ib.* No. 35.—*Duval* De aneurysmate varicoso, Theses, 8vo. Paris, 1786.—*Garneri*, v. *Bertrandi* Oper. post. delle Operaz. chirurg. Vol. III. p. 208.—*A. v. Brambilla* Von der blutaderichten Schlagadergeschwulst (A. venosum) in d. Abhandl. der Josephin. med. chir. Akademie, Vol. I. p. 92.—*Van Wy* Samml. einiger Wahrnehmungen, u.s.w., No. 1.—*Pott*, Vol. I. p. 173.—*B. Bell*, A System of Surgery, Vol. III. p. 199.—*Monteggia* Instituzioni chirurgiche, Vol. I. p. 187.—*Park* in Medical Facts and Observations, Vol. IV. p. 111.—*Scarpa*.—*Nouvel* in *Capelle* Journ. de Santé, et d'hist. nat. de Bordeaux, Vol. III. p. 107.—*Atkinson*. v. *S. Cooper's* Surgical Dictionary.—*Chidella* in *Canella's* Giorn. di Chirurgia pratica. Januar. 1827.—In the above cases the disease occurs after badly performed blood-letting in the arm, although it occurs in other parts, and from other causes; for instance, from a stab with a sword in the popliteal artery and vein, noticed by *Larrey* at Toulouse. v. *Larrey* Mémoires de Chir. mil. Vol. IV. p. 340. The same case is described by *Lassus* Médecine opératoire, Vol. II. p. 443.—*Sabatier* Médecine opératoire, Vol. I. p. 417.—*Richerand* in Dict. des Sc. médic. Art. Aneurysme variqueux, and *Boyer* Traité des Maladies chirurgicales, Vol. II. p. 177.—On the aorta and vena subclavia by a sword wound, and on all the veins of the arm by a stab in the armpit. v. *Larrey*, Vol. IV. p. 431.—Through a stab in the art. carotis communis, and vena jugularis, observed by *Larrey* in *v. Froriep's* Notizen, No. 259, Vol. XII. No. 17, p. 271; and *Williaume* in Journ. compl. du Dict. des Sciences médicales, Vol. XI. p. 91.—By small shot in the art. tibialis posterior. v. *Dorsey* Elements of Surgery, Vol. II. p. 210, Philadelphia, 1813.—In the thigh by a stab with a red-hot piece of iron; and in the knee by a pistol shot. v. *Hodgson*, p. 514, ff.—On the arm after injury. v. *Richerand* Histoire des Progrès récens de la Chirurgie, p. 119, 122.—After wound by small shot. v. *Pl. Adelmann* Tractatus anat. chir. de aneurysmate spurio varicoso. 4to. Würceburgi, 1821, with lithographic engravings. After a contusion between the art. radialis and the vena cephalica. v. *K. Schottin* merkwürdiger fall von aneurysmatischer Venegeschwulst. 4to. Altenburg, 1822, with plates.—On the crural artery and vein in the middle of the thigh by a wound with a knife. v. *J. Th. Fleischer* D. aneurysmatis varicosi complicati historia. Dorpat, 1822.—Besides other cases, one also in the art. and vena iliac externa. v. *Brodie* in London med. and physic. Journ. Feb. 1827.

§ 195.

The CAUSES which produce aneurysm are of very different kinds. The most common is a MORBID STATE OF THE INNERMOST, and frequently also, AT THE SAME TIME, OF THE FIBROUS COAT, by which they lose their elasticity, become soft and easily ruptured, and are even entirely destroyed.[1] Thus is produced an ANEURYSMAL DISPOSITION, which it is clear may, consequently, produce several aneurysms in the same individual, sometimes at once, and sometimes consecutively.[2] Old age, the male sex,[3] and several general diseases, especially syphylis and gout, in which all the internal coats easily lose their elasticity, dispose to aneurysm. Other frequent causes of this disease are MECHANICAL INFLUENCES, which render the artery diseased, or immediately weaken or break up its connexion, as concussion, rupture, contusion and actual wounds from sharp instruments, splinters of bone in fracture, &c.; but especially bleeding.[4] Lastly, aneurysms may now and then be spuriously produced by INFLAMMATION, SUPPURATION, and MORTIFICATION IN THE NEIGHBOURHOOD of an artery.[5]

(1) Compare further on.

(2) Instances given by *Morgagni.—Ruysch* Opera Obs. anat. chir. Vol. I. p. 4.—*Matani* in *Lauth's* Collect. p. 290, (innumera dispersa per totum corpus.)—*Donald Monro*, on the A. mesenterica superior, inferior, renalis, and cruralis.—*Alex. Monro*, on both A. inguinales, crurales and popliteæ. — *Arnaud* in Mémoire de chirurg. Vol. I. p. 182. — *Guattani*, p. 158 and 232. — *Stoll* Rat. Medendi, Vol. I.—*Michaelis.* v. *Loder's* Journ. Vol. II. p. 665, (nine pieces on the arm.) — *Sömmerring* on *Baillie*, p. 16, note 31.—*Guerin*, v. Journ. 1. ausländ. med. chir. Litt. 1802, October, p. 338, ff. — *J. Major Wilson.* v. *Ib.* Vol. III. p. 1. — *Ev. Home*, in two cases. v. Neues Journal der ausl. med. chir. Litt. Vol. I. Part II.—*Baillie* in Transact. of a Soc. for the improv. of med. Knowl. Vol. I. p. 121.—*A. Cooper* in Med. chir. Transact. Vol. IV. p. 427.— *Warner*, Cases in Surgery, p. 139, (the brachial artery was tied three times, on account of recurring aneurysm.) — *Pelletan* Clinique chirurgicale, Vol. II. p. 1, (sixty-three in one body.)—In two cases of operation for popliteal aneurysm, the patient died by bursting of aneurysm of the aorta. v. London medical Review, Vol. II. p. 420; and *Burns*, Diseases of the Heart, p. 261.—Five following each other on the descending aorta, were seen by *Mayer.* v. Jahrb. medic. des Oesterr Staates. Vol. V. Part III. p. 62. — Several, *O'Reardon* in Journ. de Medic. continué, Vol. XVI. p. 482. — *Beauchene, ib.* 1810, Sept. p. 209. — Aneurysm on the aorta, described by *Münzenthaler* præs. *Münz*, five on the same.—*Ulrich* in *Hufeland's* Journ. 1823, October, p. 122. — Two on the aorta, *Clocquet* in Revue medicale française et étrangère. March, 1823; and *Ekström* in Ars. Berättelse om Svenska Läkare-Sällskapets Arbeten. Stockh. 1825. — An aneurysm, first in the left, and then in the right ham, described by *Travers*, in Lond. medic. and phys. Journ. Vol. LVIII. p. 25. — A man, who had aneurysm in the ham and thigh, died, after operation for it, of aneurysm of the arch of the aorta, from London medic. Repository. — In the Mus. at St. Thomas's Hospital I saw seven aneurysms in one body.

(3) Of sixty-three cases, fifty-six in men and only seven in women. v. *Hodgson*, p. 130.

(4) An aneurysma spurium on the arm, in consequence of bleeding, is described, among others, by *Th. Bartholin*, in Hist. anat. rar. 1754. Cent. II. Hist. IX.—*Molinelli* De aneurysmate a læsa brachii arteria. 4to. Bonon. 1756.

Macquil and *Monro*, in Edinb. med. Essays and Observations, Vol. II. and III.—*Guattani* in *Lauth*, p. 216.—*Teichmeyer* resp. *Emmrich* D. de stupendo aneurysmate in brachio, etc. Jenæ, 1734.—*Ludwig* Pr. de variantibus arteriæ brachialis ramis in aneurysmatis operatione attendendis. Lips. 1767.—*Trew* Aneurysmatis spurii post venæ basilicæ sectionem orti histor. et curatio. 4to. Norimb. 1769.—*Schmucker*, v. Vermischte chir. Schriften. Vol. I. p. 329. Vol. II. p. 165, Vol. III. p. 318.—*Ol. Acrel* Chir. Vorfälle, Vol. I.—*Loder* Pr. historia aneurysmatis spurii arteriæ brachialis feliciter curati. Jenæ, 1795.—*Penchienati*, *Guerin*, and *Adams*, in Journ. der Ausländ. med. chir. Litt. Vol. II. p. 369 and 443.—*Cartier* and *Vimont* s. Neues Journ. d. ausl. med. chir. Litt. Vol. II. Part II. and Vol. VI. Part I.—*Gius. Flajani* in Osservazioni e Riflessioni di Chirurgia, Vol. II. Osserv. VII.—X. and Riflessioni generali, p. 41—66.—*B. Travers*, in London medical and physical Journ. April and July, 1827, 8th case.—*A. Cooper's* Lectures, Vol. II. p. 78.—Many other cases are collected in *de Plouquet*, Art. aneurysma arteriæ brachii, and A. spurium. In a case which I have before me, the injury was cured by compression, as, the man having died about two months after, I found the hole in the artery still open, but a little plastic bag at first about the size of a pea, and with thick walls, the commencement of an A. spurium circumscriptum, situated on the aperture. [I once saw in a wound by a penknife of the external carotid, close to the origin of the lingual artery, a similar little bag about as large as a pea, into which the artery opened. The patient had lived some weeks after the common carotid artery had been tied for this accident; but adhesion did not occur at the point on which the ligature was applied, and he died of hemorrhage, but no blood escaped from the original wound. T.]—A good engraving of false aneurysm on the arm in consequence of blood-letting is given in *Tiedemann* Tabulæ arteriarum, Fasc. II. tab. 14. fig. 2.

(5) For instance, after shot wounds. I saw an interesting case of this kind in one of the students here (Breslau,) who had received a shot through the right shoulder joint, in consequence of which, half a year after a diffused aneurysm of the axillary artery took place, which, at last, ran into spurious diffuse aneurysm, and caused death by mortification. Cases of aneurysms on the arm, arising from mortification, are described by *Pecklin* D. seu historiam vulneris thoracici.—*Scarpa*, Obs. 9.

§ 196.

Aneurysms occur BY NO MEANS EQUALLY FREQUENT IN ALL ARTERIES, but are much more common in the larger than in the middle-sized and smaller arteries; they are much less frequent in the pulmonary artery than in the aorta, and also more uncommon in the upper than in the lower extremities, where they moreover often appear spontaneously, while in the former they originate almost solely from mechanical causes. Aneurysms, both in men and animals, are observed by far the most frequently on the *aorta*,[1] especially on its arch; next on the *art. poplitea*,[2] the *art. cruralis*, the *iliaca*,[3] the *subclavia* and *axillaris*,[4] and the *carotis*;[5] more rarely are they on the smaller arteries, viz. the *coronaria cordis*,[6] the LESSER BRANCHES of the *carotis* on the head, as the *maxillaris, temporalis, auricularis, occipitalis*,[7] &c., on the *vertebralis*,[8] the *mammaria interna*,[9] the *thyreoidea*,[10] on the *circumflexa humeri anterior*,[11] the ARTERIES OF THE FORE-ARM and HAND,[12] on an *intercostalis*,[13] *bronchialis*,[14] on the *cœliaca*

and ITS BRANCHES,[15] the *mesenterica superior* and *inferior*,[16] one *renalis*,[17] *spermatica interna*,[18] *glutæa*,[19] *ischiatica*,[20] *pudenda*,[21] on the ARTERIES OF THE LEG and FOOT;[22] and lastly, also on the PULMONARY ARTERY,[23] and on the *ductus arteriosus*.[24]

(1) The first observation on aneurysm of the aorta was made by *Vesalius*. v. *Boneti* Sepulchretum anat. Lib. IV. sect. 2. Obs. 21.—*Alex. Knips Macoppe* Epist. de aortæ aneurysmate et polypo cordis. 8vo. Brixiæ. 1731.—*Haller* Pr. de aneurysmate aortæ. Göett. 1749.—*Matani.*—*Ed. Sandifort* Heel en ontleedkondige Verhandeling over eenen Slagader Breuk in de groote Slagader, etc. Gravenhage, 1765; *Verbrugge*, *Lombardini*, and *Burns.*—*Naegele* Epist. ad *Th. Fr. Baltz*, Qua hist. et descript. aneurysmatis, quod in aorta abdominali observavit, continetur, addita tab. ænea. 4to. Heidelb. 1816.—*J. N. Heisler* D. rariorem atque memoratu dignissimam aneurysmatis aortæ sternum perforantis historiam exhibens. Landishuti, 1817.—*Laennec* Des aneurysmes de l'aorte in De l'auscultation médiate, 1819, Vol. II. p. 404.—*Ehrhardt* De aneurysmate aortæ Comment. anat. pathol. 4to. Lips. 1820, with five engravings.—*G. Noverre* D. sur les aneurysmes de l'aorte. 8vo. Paris, 1820.—*H. Hartmann* D. Observatio ingentis aortæ aneurysmatis. 8vo. Berol. 1828.—Many individual cases are collected by *Verbrugge*, *Eberhardt*, *Scarpa*, and *Harles.*—*Puchelt* Ueber aneurysmen der bauchaorta in Heidelb. klin. Annal. Vol. III. Part IV. No. 6 (with a case of his own); and *Plouquet* Repert.—I have nine times observed aneurysm of the aorta.—Compare my Verz. No. 2254—58, 8498, 8690.—In animals also, aneurysms of the aorta occur, especially on the posterior aorta in horses, of which I have seen many instances in the collections of the veterinary schools; such are described also by *Grognier*. v. Correspondance sur la conservation et l'amelioration des animaux domestiques par *Fromage de Feugré*, Vol. II. p. 97.—*Carville* in Annuaire de la Soc. de Méd. du Depart. de l'Eure, 1806, p. 308.—*Huzard* in Bulletin de la Fac. de Méd. et de la Soc. de Paris, Ann. XIII. p. 45.—In *Sus Tajassu*. v. *Daubenton* in Allg. historie der natur, Vol. V. Part II. p. 22.—*Edw. Tyson*, The anatomy of a pigmy compared with that of a monkey, an ape, and a man, &c. Lond. 1731 (three behind each other).—*Viverra Nasua*, from a verbal remark of *Ducrotay de Blainville.*—Good engravings are also given in *Littre* in the Mémoires de l'Academ. R. de Paris, Ann. 1707.—*Ruysch* Observ. anat. chir. p. 37.—*Haller* Opera minor, Vol. III. p. 301, tab. 9.—*W. Hunter*, in Medic. Obs. and Inquiries, Vol. I. tab. 4 and 5.—*Bayford*, *Ib.* Vol. III. pl. 1.—*Walter*, in the Mémoires de l'Acad. de Berlin, Ann. 1785, p. 56, tab. 1 and 2.—*Sandifort* Museum anat. Vol. II.—*Scarpa*, pl. 8, fig. 1, 2; pl. 9, fig. 1, 2; translated by *Harles*, pl. 10, fig. 4, 5.—*Baillie*, Engravings, Fasc. I. pl. 3, fig. 2.—*Monro*, Outlines of the anatomy of the human body, &c., pl. 33—35.—*Hodgson*, pl. 2.—*Meckel* Tab. anat. pathol. Fasc. II. pl. 12, 13, 15, &c.

(2) *Sabatier* D. de poplitis aneurysmate. Paris, 1772.—*Massotti* D. sull' Aneurisma del poplite. Firenze. 1772.—*La Motte* D. de poplitis aneurysmate. Paris, 1773.—*Aug. Grima* De poplitis aneurysmate. Malta, 1773.—*Penchienati* Recherches anat. pathol. sur les aneurysmes des artères crurale et poplitée. 8vo. 1786.—*Windel* D. de aneurysmate, præsertim de illo arteriæ popliteæ. Goett. 1795.—*Deschamps* Observat. et Reflex. sur la ligature des principales artères, et particul. sur l'Aneurysme de l'artère poplitée. 2d edit. Paris, 1797.—*Vaccà Berlinghieri* Istoria d'un Aneurisma del poplite.—*Hutchinson*, Letter on popliteal aneurysm. 8vo. London, 1811. The disease is very frequent in coachmen and carriers.

(3) *Alefeld* D. aneurysmate arteriæ cruralis in cartilaginem et os mutato. Giessæ, 1763.—*Ad. Murray* resp. *Arvidsson* D. in aneurysmata femoris observationes. 4to. Upsal. 1781.—Compare *Lauth's* Collection.—*Hosak*, Case of aneurysm of the femoral artery. 8vo. New-York, 1812.—*Dawidowicz* D. exhibens casum aneurysmatis arteriæ cruralis. 4to. Regiom. 1821, with a lithographic plate.—*J. A. L. Casamajor* Reflexions et Observations anat. chirurgicales sur l'aneurysme spontané en général et sur celui de l'artère femorale en particulier.

4to. Paris, 1825, (he relates forty-six cases of spontaneous or artificial closure of the art. iliaca externa and interna.)

(4) A good engraving of an aneurysm in the armpit is given by *Dupuytren* in Répert. gén. d'Anat. et de Physiol. pathol. etc. Vol. I. No. 2, pl. 2. Paris. 1826. —Sometimes they arise in this region from violent extension in reducing dislocation. v. *Pelletan* Clinique chirurgicale, Vol. II. p. 95. —*Gibson* in Philadelphia Journal by *Chapmann*, Vol. VII. No. 1, Nov. 1823. — *Flaubert* in Répertoire général d'Anatom. et Physiol.-pathol. Vol. III. Part I. p. 102, 1827.

(5) Both on the carotis communis, and on the externa and interna, a good engraving of an aneurysm of the carotis is given by *Scarpa*, pl. 8. fig. 4 and 5.—*J. Vose* D. de arteriæ carotidis aneurysmate. Edinb. 1809. — *P. J. Vanderhagen* D. sur l'Aneurysme de l'artère carotide. Paris, 1815.

(6) *Hedlund* in Svenska Läkare-Sällskapets Handlingar, Vol. III. p. 181.— In a man of forty years old it was fatal by bursting and effusion of blood into the pericardium.

(7) To wit, on the lingualis. v. *Collomb* Œuvres méd. chir. p. 451. — On the maxillaris externa. v. *Gilibert* Adversaria pract. prim. p. 3.—*Ant. Petit* in Mém. de Paris, 1765, Hist. p. 38, Mem. p. 480.—It also occurs here in horses.—On the art. palatina of a horse. v. *Schwab* Materialien zu einer pathol. Anatomie der Hausthier. p. 3. 1te Lief. München. 1815,—On the art. nasi externa. v. *de Haen* Ratio Mendendi. Part IV. p. 11. — On the art. frontalis. v. Acta eruditor. p. 51, Lipsiens. 1699; and *Meckel* in Journ. de Méd. Vol. XLVIII. p. 239.—On the art. temporalis. v. *Palletta.—Scarpa*, p. 529; and several instances in *de Plouquet* Repertor.—On the auricularis. v. *Klaunig* in Ephem. Nat. Cur. Cent. III. Ann. 1715. Obs. 66.—*A. Cooper.* v. *Burns*, p. 266.—On the occipitalis. v. *Vidus Vidius* Op. omnia. L. VI. — *Vareliaud.* v. Journ. d. ausländ. med. chir. Litt. 1803, Vol. I. p. 154.—*Mejer* D. de aneurysm. occipitali. Würceb. 1804.—*Pelletan* and *Tartra;* compare § 193, note 3.—*Richter.* v. *von Froriep's* Notiz. No. 24, p. 29, Feb. 1822 (as big as a pigeon's egg.)—*Fr. E. Schilbach* D. s. casum aneurysm. in capite virginis sexagenariæ rar. 4to Jenæ, 1825, with plates.—*Dopfer* Geschichte eines Pulsaderbruches auf dem Kopfe in Beobacht. und Abhandl. aus dem Gebiete der gesammten prakt. Heilk. Vol. V. p. 416. Wien. 1820. I have a case at present in a living boy, who has water on the head and amaurosis; the aneurysm, however, is not on the occipitalis, but the strong pulsating tumour on the back of the head receives its blood distinctly from the skull, by a small hole in the upper part of the occipital bone.—On the meningeis. v. *J. N. Holtorf* Casus aneurysmatis in capite pueri 11 annorum. Argentorati, 1722.—*Röderer* De cerebri scirrho. 4to. Gött. 1762.—*Stoerck* v. *Lieutaud* Hist. anat. méd. Vol. II. p. 325. Lib. III. Obs. 54.—*Malacarne* Encefalotomia nuova univ. p. 68, Torino, 1780 (as large as a pigeon's egg.) — *Krimer* in *v. Gräfe* and *v. Walther's* Journ. d. Chir. Vol. X. Part IV. p. 587, 1827 (on the meningea media; the skull was perforated.)—On the carotis cerebralis, where it appears in the skull; I have found it twice; similar cases were seen by *Biumi* in *Sandifort* Thesaur. III. p. 373.—*Gilb. Blane*, in Transact. of a Soc. for the improv. of medic. knowl. Vol. II. p. 193.—*Baillie's* Morbid anat. &c. p. 468. 5th edit. Lond. 1818.—*Chevalier* in Journ. univ. des Sc. medic. Janv. 1828 (on the cerebral arteries.) v. *Bell*, Anatomy of the human body, Vol. II.—*Hodgson*, p. 116, ff. and 177, (in four instances on the basilaris, and on the anterior cerebri.)—*Serres* Annuaire medico-chirurg. p. 314.—*Ollivier* Traité de la moelle épinière et de ces maladies, &c. 8vo. 2 vols. Paris, 1827. Case 23.—*Spurgin* in London medic. Repos. June, 1825 (on the cerebralis arterior.)—On the ophthalmica, v. *Desessarz* in Auserles. Abhandl. f. prakt. Aerzte. Vol. XVIII. p. 99, ff. The reason why the thin-coated arteries of the brain are proportionally found so rarely aneurysmal, depends on their being soon ruptured at the commencement. [In the Mus. St. Thomas's Hospital there is a beautiful preparation of aneurysm of the cerebralis media, about the size of a small pea, which burst and produced apoplexy; it illustrates extremely well the preceding observation. T.] I have, however, seen, a few times little aneurysms of the A. fossæ sylvii, of the A. corpus callosum, and once the A. cerebelli, but not larger than a vetch or a pea.—*Chevalier* in London Med. and Phys. Journal, by *Macleod*, new series, Vol. LVIII. 1827.—*Abercrombie* Patho-

logical and practical remarks on diseases of the Brain and Spinal cord. 8vo. Edinb. 1828.

(8) Hence pressure on the spinal marrow; one case in *Heaviside's* Cabinet. v. *Hodgson*, p. 116; and *Howship*, Practical Observations in Surgery and morbid anatomy, p. 59. Lond. 1816, — *Malacarne* found, in two instances, aneurysms on the arteries of the spinal marrow as large as peas.

(9) *Sommer* in der Petersburger Sammlung f. Naturwissenschaft und Heilkunst, Vol. II. Part II. p. 1.

(10) Especially in some cases of struma aneurysmatica, in which the arteries of the thyroid gland are rather generally enlarged.

(11) *Portal*, Cours d'Anatomie médicale, Vol. III. p. 236.

(12) On the radialis. v. *Fischer* in Mus. der Heilkunde, Vol. II. p. 276.— On the arteries of the hand. v. *Guattani* De extern. Aneurysmat. Hist. XXI.— *Becket*, Chirurgical Observations. —*Hildanus* Centur. III. Obs. 44. — *Tulpius* Observ. med. Lib. IV. Obs. 17.—*Ranby* in Chirurgical Observations.

(13) *Ruysch* Thesaur. anat. IV. No. 5.—Obs. anat. chir. XXXVIII. — Acta Eruditor. Lips. 1714, Sept. p. 420. — *Vylhoorn* in der Holland Uebers. v. *Heisteri* Instit. chir.

(14) *A. Leprottus* in Comment. Bonon. Vol. I. p 345 and 353.

(15) On the cœliaca, v. *Guerin*, Vol. II. p. 348. — *Nenci* Observatio de disrupta splenica arteria. Siena. 1786.—[In Museum of St. Thomas's Hospital, aneurysm of the cœliac artery, which, by its motions against the stomach, produced vomiting whenever food was taken, and the patient died of consequent starvation.—T.]—*Portal*, p. 268.—*Nysten* in the Journ. de Médec. Chir. et Pharm. Oct. 1815. — *Isenflamm* Anat. Untersuchungen. Erlangen, 1822, p. 207.—On a twig of the cœliaca. v. *Lancisi*, p. 64.—On the coronaria ventriculi. v. *Portal.—Souville* in Journ. d. Médec. Vol. L. p. 239.—*Delmas* in Annales de la Soc. de Méd. prat. de Montpellier, Vol. VIII. Part I. p. 233, Sept. 1806.— On the splenica, v. *Nenci.—Morgagni*, Epist. III. p. 2. — *Beaussier* in Journ. de Médec. Vol. XXXII. p. 157.—*Staupa* Answeisung zur gerichl. und. pathol. Untersuchungen von menschlichen Leichnamen, p. 186, note. 8vo. Wien, 1827. I have seen three times little aneurysmal expansions of the splenic artery, which cannot be confounded with their convolutions.

(16) *Donald Monro* in Edinburgh Essays, &c. Vol. III.—They not unfrequently occur in horses and asses in the anterior mesenteric artery, and frequently contain worms, viz. the strongylus armatus minor, *Rudolph.* which, as they are often situated in tubercles in the arterial coats, and render them diseased, in many instances, are the cause of aneurysm. Compare *Rudolphi* Entozoor. v. vermium intestinal. historia naturalis. Vol. I. p. 437, Vol. II. p. 204, and Synopsis, p. 259.—*Grognier* in Journ. de Médec. cont. 1810, Dec. p. 504.—*Hodgson*, p. 581, ff. with a good plate, in Engravings intended to illustrate some of the diseases of Arteries, tab. 8, fig. 2. 4to. Lond. 1815.—*Greve* Erfahrungen und Beobachtungen über die Krankheiten der Hausthiere, Vol. I. p. 105; both the latter have not *always* worms as the cause of aneurysm. One instance in Bresl. Mus. v. Verzeichniss, No. 2259.

(17) Ephem. Nat. Curios. Cent. IX. Obs. 59.—*Julien* in Journ. de Médec. Vol. XIII. p. 359.—*Donald Monro.—Nenci.—Titius* Pr. aneurysmatis arteriæ renalis sinistræ exemplum. Viteb. 1798.

(18) *Vilhoorn.—Julien.* Perhaps also here belongs the case of an aneurysm on the proper coat of the testicle. v. *Bird* in Mem. of the med. Soc. of London, Vol. IV. p. 406.—The situation of an aneurysm on the organs of generation, which was fatal by bursting, is doubtful. v. *Osiander* Denkwürdigkeiten, Vol. I. p. 2. No. 1.

(19) *John Bell*, Principles of Surgery, Vol. I. p. 421.—*W. Stevens* in Medic. chir. Transact. Vol. V. p. 422. [It has recently appeared, however, from the dissection of this case, v. *Owen* Med. chir. Trans. Vol. XVI. p. 219, that the diseased artery was the ischiatica, and not the glutea, as supposed. T.]—*Atkinson* in Medic. and physical Journal, Vol. XXXVIII. p. 267.—*White* in American Journ. of the med. Sciences. Febr. 1828.

(20) *Ehrmann* Compte rendu, etc. p. 24, Strasburg, 1827.

(21) *B. S. Albinus* Adnot. acad. L. III. p. 27, after violent extension of a dislocated limb.

(22) *Guattani*, p. 162, ff. (on the calf of the leg.) p. 176, Hist. XXII. (on the top of the foot after blood-letting.)—*Ehrlich* Chir. Beob. p. 104, (on the tibialis.) —*van Esch* Heelkondige Waarneeminge, etc. Gouda. 1772, (also on the tibialis from mortification.) — *Tartra.* v. *Harles* N. Journ. d. ausl. med. chir. Litt. Vol. VII. Part I. p. 190, ff.—*Hodgson*, p. 438.

(23) *Andr. Caesalpin* Catoptrices, Lib. VI. cap. 20. —*Ambr. Paré.* L. I. De tumoribus. Cap. XXVIII. — *Blancard* Anat. pract. rat. Cent. II. Obs. 74.— *Fabriz von Hilden* Observat. et Cur. chir. Cent. II. Obs. 89. —*Eggerdes* in Misc. Acad. N. Cur. Dec. II. Ann. VI. 1687, p. 415.—Several instances are collected in *Morgagni*, Epist. XXIV. 36. —*Matani* De aneurysmat. præcordior. morbis. p. 145. — *Baader* Observ. med. incision. cadav. illustr. Frib. 1765.—*Bach.* v. *Richter's* Chir. Bibliothek. Vol. VIII. p. 498. — *Eisenschmidt* in *Schmucker's* Vermischt. Schriften, Vol. II. p. 241. — *J. C. Stark* in Abhandlungen der Erlanger physic. medic. Societät. Vol. I. p. 472.—I saw one instance in the Anat. Mus. at Strasburg. Compare *Lobstein* Compte rendu, etc. p. 35.

(24) Pathol. anat. Atlas zur Erläut der Geschichte der Kinderkrankh. v. *Billard*, Taf. VII. fig. 1.

§ 197.

Lastly, as to the TERMINATION of aneurism, this, if surgical assistance be not rendered, is necessarily mortal, as the tumour by continued extension at last bursts, and bleeding ensues. Should the consistence of the arterial walls be very much diminished, or the current of blood be very strong, even small aneurysms burst early. If the diseased artery be situated apart in one of the great cavities of the body, it usually at once bursts the surrounding thin serous membrane, and a fatal gush of blood takes place into the cavity of the skull, chest, pericardium or peritoneum;[1] if, however, the aneurysmal sac be directed towards the harder parts, and consolidated with them, the effusion of blood does not take place into the great cavities of the body, but by preceding erosion of the neighbouring bones, membranes, &c., either externally,[2] or into the air tube[3] and its branches,[4] the gullet,[5] the stomach,[6] the intestines,[7] the urinary bladder,[8] even into the heart and other blood-vessels.[9] If the aneurysm occur on the external parts of the body, then the blood is effused among the muscles, into the aponeuroses and beneath the skin, all which parts it greatly expands, and becoming more or less coagulated, forms a continually increasing tumour, which at last assumes an inflammatory and gangrenous disposition, and produces a slough of those parts of the common integuments which are most distended, upon the immediate or repeated throwing off of which fatal hemorrhage ensues. It is interesting to observe, how the conservative power of the system strives to prevent this melancholy termination of the disease: the fibrous part of the blood being, in the later stages, naturally deposited in more or less thick and concentric layers within the

aneurysmal sac, which is thereby remarkably strengthened.[10] In rare cases a SPONTANEOUS CURE is thus effected, inasmuch as the aneurysmal sac is entirely filled with fibrous matter, whilst the artery itself remains pervious, or more commonly the fibrous matter fills up the whole artery as far as the last collateral branch. In not less rare cases the SPONTANEOUS CURE of the aneurysm is effected by the aneurysmal sac itself, which having become enlarged and hard from being filled with fibrous matter, compresses its artery, and produces adhesion; or the sac is destroyed by the inflammatory shutting up of the artery, with simultaneous suppuration and mortification.[11]

(1) *A. Burns*, On some of the most important Diseases of the Heart, p. 258, first pointed out that the serous membranes, into the cavities of which internal aneurysms had been effused, were not destroyed like mucous membranes, and the common integuments by suppuration or mortification, but by bursting.—*Hodgson*, p. 86, confirmed this, as also can I from several cases which have come before me.—In rare cases the blood of a burst aneurysm of the thoracic aorta does not empty itself into the chest, but penetrates between the legs of the diaphragm in the cellular tissue behind the peritoneum, and thence first makes its way through the peritoneum into the cavity of the belly. v. *Richerand* Nosogr. chirurg. 2d edit. Vol. IV. p. 82.—*Scarpa*, Sull' Aneurysma, found, on the contrary, an aneurysm of the abdominal aorta, which penetrated into the chest.—*Morgagni* Epist. XL. p. 29. — Aneurysms near the heart burst soonest, and naturally into the pericardium. Effusion of blood from aneurysm into the left pleura is common, but very rarely into the right pleura and mediastinum. v. My Selt Beob. Part II. p. 65.—*Hodgson*, p. 481, mentions two cases in which aneurysm of the aorta burst in the mediastinum and mesentery, and so caused death.

(2) Aneurysms of the arch of the aorta sometimes ascend into the neck, and may be confounded with aneurysm of the carotid and subclavian; most commonly, when they do not burst internally, they perforate the breast-bone, the neighbouring ribs, or the clavicles, dislocate the latter, and form, more or less, large tumours on the front of the chest. Instances are mentioned by *J.Lefaye* in Phil. Trans. 1700, p. 666.—*Morgagni* De sed. et caus. Morbor. Epist. XXVI. 9. — *Morand* in Mém. de Paris, 1721, Hist. p. 30. — *Weltinus* D. de aneurysmate vero pectoris externo, hemiplegiæ sobole. 4to. Basil, 1750. v. *Lauth's* Collect.—*Verbrugge* D. de aneurysmate, L. B. 1778, fig. 4. tab. 1—6.—Ephem. Nat. Cur. Cent. V. and VI. Obs. 74.—*Ehrlich* Chirurg. Beob. p. 93, 95, 96.—*Schreiber* in Nov. Comm. Petrop. Vol. III. Hist. p. 36, Mém. p. 401.—*Weikard* Vermischte medicinische Schriften, Vol. II. No. 6.—*Armane* in *Sédillot's* Recueil période. de la Soc. de Santé de Paris, Vol. X. p. 390.—Compare above § 136, note 29, and § 137, note 18; also *Scarpa* in Hist. et Mém. de la Société de Méd. 1780 and 1781, Hist. 290.—*Rosenmüller* in *Harles'* translation of *Scarpa*, p. 364.—*Biermeyer* Mus. anat. pathol. p. 94, No. 575. Vindob. 1816.—*N. Heisler* De rariorem atque memoratu dignissimam aneurysmatis aortæ sternum perforantis historiam exhibens. Landish. 1827.—*Hodgson*, p. 105, case 17.—*Laennec* De l'Auscultation médiate, Vol. II. p. 431.—*Cerutti* Beschreibung der pathol. Präparate zu Leipzig, No. 286, engraved in *Ehrhardt* Comm. de aneurysmate aortæ, tab. 3.—*Pfeufer* in *Horn's* Archiv für medic. Erfahrungen, 1824, May and June, p. 452.—*A. Cooper*, Lectures on the principles and practice of Surgery Vol. II. p. 31. —Compare also *Lieutaud* Hist. anat. med. ed. *Schlegel*, Vol. II. p. 255, Obs. 796, 805, 810, 811, 814, 816, 823, 824, 827, 830, 831, 832, &c.—Sometimes such tumours do not burst externally, but sink down again, because the aneurysmal sac is more expanded inwardly. Very rarely such aneurysm, having run into suppuration, actually bursts, but it discharges no blood. v. *Delort* in Nouvelle Biblioth. médic. May, 1826. — Aneurysms of the descending aorta frequently destroy the hinder

part of the ribs and their vertebræ, and protrude through the ribs as larger or smaller swellings.—Compare *de Heyde* Observat. med. 8vo. Amstel, 1686, No. 34. —*Noortwyck* Obs. de gibbo ab aortæ aneurysmate, ad *Solani* Observ. de pulsu. 8vo. Amstel. 1746.—*Walter* Sur les maladies du Cœur in d. Nouv. Mém. de Berlin, 1785.—*Lieutaud* Hist. anat. med. ed. *Schlegel*, Vol. II. p. 253, ff. No. 795 and 809.—*Horn* Archiv f. prakt. Medecin. Vol. IV. p. 290.—*Kreysig* Herzkrankheiten, Vol. III. p. 176, ff.—*Laennec*, p. 429, ff.—*Cerutti* Beschreibung der pathol. Präparate zu Leipzig. No. 285, engraved in *Ehrhardt* Comm. de aneurysmate aortæ. Lips. 1820, tab. 4.—*Salomon* in Petersb. vermischten Abhandlungen aus dem Gebiete der Heilkunde. 3te Samml. 1825, p. 164, pl. 2.—*Schön* in *Hecker's* Litter. Annalen d. ges Heilk. Sept. 1828, p. 10, in two cases.—*A. Cooper*, Vol. II. p. 30—35, in the latter case the aneurysm was mistaken for lumbar abscess.—In the cases of *Kreysig* and *Salomon*, the blood penetrated even into the spinal canal.—*J. Rainy* in London Med. and Phys. Journ. Dec. 1827.

(3) *Boneti* Sepulchret. anat. L. II, § 5, Obs. 8. — *Lieutaud* Hist. anat. méd. Vol. II. p. 258. Obs. 802.—*Hall*, in Medical Observations and Inquiries, 1784, Vol. IV. p. 23. v. *Richter's* Chir. Biblioth. Vol. IX. p. 376. — *Richerand* in Mém. de la Soc. méd. d'Emulat. Ann. IV. p. 345. — *Corvisart.* — *Newbolt* in London medical Repository, March, 1826, Vol. V. No. 27.—*Biermayer* Museum anat. patholog. Vindob. 1816, p. 96, No. 96. — *Mandruzzato* in Memorie scientifiche e letterarie dell' Ateneo di Treviso. Vol. I. 1817. — *Hodgson*, p. 134, case 17.—*Mussey* in the New-England Journ. of Medic. and Surgery, Vol. VII. No. 2. Boston, 1818.—*Noverre* D. sur les Aneurysmes de l'Aorte. Paris, 1820.—*Andral* in Archives général. de Médec. Nov. 1823, p. 466.—*Ward* in London medical Repository, Vol. XXI. No. 131. Nov. 1824. — *Bertin* Traité des maladies du Cœur, etc. p. 107.—*Hesselbach* Beschreibung der pathol. Präparate zu Würzburg, p. 279, No. 550. — *Meriadec Laennec* in Revue médic. franç. et étrangère, 1825, Vol. IV. p. 3. — *Heusinger* Erster Bericht der anthropotom. Anstalt zu Würzburg, 1826, Pref. p. v. — *Schön*, in two cases. — *A. Cooper*, Vol. II. p. 32.—I also saw engravings of such cases at Venice, at *Allietti's*.

(4) In the cells of the lungs. v. *Pelletan* Clinique chirurgicale, Vol. I. p. 89.—*J. O'Reardon* in *Graperon* Bulletin des Sc. médicales, Vol. II. p. 411. — *Laennec*, Vol. II. p. 63 and 427.—In the bronchus. v. *E. Fritz* D. s. Observationem de aortæ aneurysmatis in bronchum ruptura. 4to. Gryphiæ, 1817, with engravings; and *Richerand*. In the left bronchus. v. *Fleury* in Ephem. médic. de Montpellier, Vol. VI. Nov. 1827.

(5) *Sauvages* Nosologia methodica, Vol. II. p. 298.—*Matani* De aneurysmat. præcordior. morbis. § 62, p. 120.—*Laforgue* in Bulletin de la Soc. de Médec. p. 154.—App. zum Journ. de Médecine continué, Vol. XIV.—*Armiger* in Medico-chir. Transact. Vol. II. No. 21, p. 244. — *O'Reardon* in Journ. génér. de Médec. Chir. et Pharm. Dec. 1808; and in *Graperon* Bulletin des Scienc. médicales, Vol. II. p. 441. — *Dupuytren* in *Corvisart* Sur les Maladies et lésions organiques du Cœur et des gros vaisseaux.—*Bertin* v. Bulletin de la Fac. de Médec. et de la Soc. de Paris, 1812, p. 14.—*Raikem* and *Bouvenot*, *ib.* p. 181.—*Bricheteau* in Bulletin de l'Athenée de Médecine de Paris, Dec. 1816. — *Copeland*, Observations on the symptoms, &c. of diseased spine. 8vo. London, 1815. — *Laennec* De l'Auscultat. méd. etc. Vol. II. p. 427, (in three cases.)—*Cerutti* Beschreibung der patholog. Präparate zu Leipzig, 1819, p. 156, No. 743. — *Becker* in *Rust's* Magazin f. die gesammte Heilkunde, Vol. XX. Part III. p. 447, with plates.—*Bertin*, p. 110. — *Proudfoot*, in Edinb. med. and surg. Journ. 1824. — *Staupa* Anweisung zur gerichtl. und pathol. Untersuchung menschl. Leichname. Wien. 1827, p. 168.*—A case in the London medical and physic. Journal, by *Macleod*, Aug. 1827, Vol. LVIII. — *Th. Molison*, in Transact. of the med. chir. Soc. of Edinburgh, Vol. III. Part I. p. 173. — Also in animals, viz. in a nasua, from the verbal communication of *de Blainville*.

(6) *Hodgson*, p. 75.—*Staupa*.

(7) *Hodgson*, p. 75. — *A. Comstock*, in Philadelphia Journal, Vol. XIII. p. 318, with engravings, (an aneurysm of the aorta opened into the flexura iliaca coli.)—*A. Cooper's* Lectures, Vol. II. p. 35.

(8) *Hodgson*, p. 75. — Perhaps also here belongs the case observed by *A. Cooper*, Vol. II. p. 36.

(9) For instance, aneurysm of the aorta in the right auricle. v. Med. chir. Journ. Vol. VI. p. 617. — Bulletin de la Soc. de Médecine à Paris, 1810, No. 3, p. 38; or in the pulmonary artery. v. *Wells* in Transact. of a Soc. for the Improv. of med. and chir. Knowledge, Vol. III. p. 85. —*Sue* in Bulletin de l'Ecole de Médec. et de la Soc. de Paris, 1809, p. 128.—*Payan* and *Zeink* in Bulletin de la Faculté de Medecine, 1819, No. 3, (two cases.)—Journ. de Médec. continué, Vol. XXIV. p. 124; and Bulletin de la Faculté, etc. Vol. XVII. p. 16.

(10) *Kreysig* thinks that the layers of fibrous matter in aneurysmal sacs originates in effusion from the walls of the artery. v. Herzkrankheiten, Vol. II. p. 388, and note to *Hodgson*, p. 124; whilst to me he seems to say, that the external layers are the firmest; the innermost are, on the contrary, the weakest, and that the quantity of fibrous matter collected is by no means proportionate to the vascular weakness of the vessel, which is often indurated, or very much expanded, and thin arterial coats. — As such coagulum is but rarely found in angiectasy, and as seldom missed in aneurysm, so the ancients improperly distinguished both forms of the disease by the coagula.

(11) *Hodgson*, p. 100, ff, treats admirably of the spontaneous cure of aneurysm, and many individual cases in *de Plouquet's* Repertorium Art. Aneurysma, and in surgical writers. — Some new cases are given by *Howship*, Practical Observat. in Surgery and morbid Anatomy, Case 110, (the art. femoralis.)—*R. Archer*, in American medical Recorder, by *Eberle*, Vol. VI. Art. 3. Philadelphia, October, 1823, (the femoral artery.) — *W. Beach*, *ib.* Jan. 1824, (the art. femoralis, from cold.) — *H. Lyford*, in the Lancet, Vol. XII. p. 767, (also the femoral.)— *J. Clocquet* in Gazette de Santé, 1825, No. 3, (the right subclavia.)—Many cases of spontaneous cure of the Art. iliaca externa and interna, are collected by *Casamajor*, Reflexions et Observat. anat. chir. sur l'Aneurysme spontanée, etc. 8vo. Paris, 1825. — An interesting case is described by *W. Darrach*, in Philadelphia Journal, Vol. XIII. p. 115. Compare Magazin der ausländ. Litt. der ges. Heilk. Sept. and Oct. 1827, p. 338. It was an aneurysm of the arch of the aorta, in which the truncus anonymus was closed, and the blood flowed from the left subclavia through the much enlarged and anastomosing arteriæ thyreoideæ inferiores, to the right subclavia. [In Mus. St. Thomas's Hospital, a fine example of spontaneous cure of aneurysm of the femoralis, by the aneurysmal sac compressing the artery between itself and the thigh bone; it is mentioned in *Cooper's* Lectures on Surgery, Vol. II. p. 47. T.]

§ 198.

The unnatural widening of vessels and aneurysmal tumours, naturally lead to the consideration of VICES OF CONSISTENCE AND CONTINUITY in the arterial system. The first arise, perhaps, in many cases without distinct change of the arterial tissue, in diminution of elasticity, and in alteration of nourishment; but usually they are consequent on actual change of texture, as inflammation and its various terminations. The DIMINUTION OF CONSISTENCE, with which we are alone concerned, is not unfrequently to such extent, that the mere strong current of blood, or slight stretching or concussion of an artery, produce gradual extension, or fine cracks, mostly in the transverse direction of the two internal membranes, whence arises the first disposition to aneurysm. Sometimes the disposition to rupture in the arteries is so great, that SPONTANEOUS TEARINGS of all the coats of the artery occur

independent of any of the just-mentioned causes.[1] In many cases also arteries burst, if their walls have been weakened by suppuration and mortification. To WOUNDS of arteries belong ruptures from violent extension,[2] then cut, thrust, and contused wounds.[3] If in thrust wounds of arteries, which may occur both in fractures of bones by bony splinters,[4] or swallowing pointed bodies,[5] the external wound is healed, whilst the blood continues pouring from the still open wound in the vessel into the cellular tissue, then it is called a spurious aneurysm.[6] If the wounded vessel be not too large, Nature stays the hemorrhage, and cures the wounded artery thus, the vessel itself contracts at its extremity, and often for a considerable distance up, and if, as is usually the case, it lies in the loose cellular tissue, it retracts,[7] whilst the effused and coagulated blood compresses the end of the artery, and closes it by an internal plug of blood, *thrombus*, *coagulum internum*. The latter now becomes firmly adherent to the artery, by subsequent inflammation and pouring out of lymph, which is thus healed by being closed, usually up to the nearest superior branch, and is gradually converted into a kind of tendinous-like band. A similar inflammatory shutting up of arteries occurs after ligature, in which besides, both the inner coats of the vessel are transversely divided, by the indentation of the ligature on the part, and thus easily give rise to the curative effusion of lymph.[8] As to the collateral vessels by which, after adhesion of an artery, the blood takes its course, it is difficult to decide whether they be merely vessels which had previously existed, increased in size, or whether they be partial new productions.[9] Small cut and thrust wounds, especially if they be longitudinal, heal in rare instances without closing of the artery by firm cicatrices;[10] so also such wounds of arteries, in which merely the external coat is destroyed, are rendered tough by the coagulable lymph which is effused.[11]

(1) v. several cases in *de Plouquet* and *Reuss's* Repertor. Art. Ruptura Arteriarum. — *Morgagni*, Epist. LIII. 35, 36, (the aorta.) — *Bohn* De officio medic. dupl. Cap. IV. p. 390, (a branch of the carotis.)—*Pyl* Aufsätze und Beobacht. aus der gerichtlich. Arzneiw. Vol. IV. Obs. 7 and 8, (the aorta.) — *Vogther* and *Kausch's* Memorabilien der Heilkunde, u. s. w. Vol. III. (the right pulmonary artery.)—*Hodgson*, p. 391, (the brachial artery from an accident, of which a similar case is mentioned by *Saviard*, Observ. Chirurg. 7th Observation.)—*Bonsdorf* resp. *Wegelius* D. anatomicam veneficii arsenico peracti investigationem sistens. Abo. 1817, (the vertebral artery from violent bending backwards of the head.)—[In Mus. St. Thomas's Hospital, the right vertebral artery ruptured in fracture of the cervical vertebræ. T.] — My Selt. Beob. Part II. p. 66, (the aorta.)—*Hamilton* in London Med. and Phys. Journ. Vol. LVII. p. 506.—*Rose*, *ib.* Vol. LVIII. (the aorta; two other cases of rupture of the aorta are also mentioned.)—*Simpson* in Trans. of Med. Chir. Soc. of Edinburgh, 1824, No. 22, (the pulmonary artery in a child.)—*J. Adam* in the Trans. of the Med. and Phys. Soc. of Calcutta, Vol I. 1827, (in the pulmonary artery.)—It is well known that

we often find the arteries of the brain burst in apoplexy, also branches of the pulmonary artery in violent coughing.—[A case of rupture of the pulmonary artery. v. *W. Gunn* in Edinburgh Med. and Surgical Journ. 1829. T.]

(2) For example, in dislocations and the extension employed to replace the bone. v. *Petit* Traité des maladies des os. Vol. I. p. 179, (the brachial artery.)—*Pelletan* Clinique Chirur. Vol. II. p. 95, (the brachial artery.) — *Popinel* in *Graperon's* Bulletin des Sc. Medic. Vol. III. p. 253, (the femoral artery in dislocation at the hip.)—*Gibson* in Philadelphia Journal, by *Chapmann*, Vol. VII. No. 1, Nov. 1823, and the Lancet, Vol. III. p. 90, (the brachial artery.)—*Flaubert* in Répertoire gén. d'Anatomie et de physiol. patholog. 1827, Vol. III. Part I. p. 102, (the brachial artery.)—When the whole limb is torn off, the arteries bleed proportionally, but little on account of their great extension; sometimes they are even stopped by the cellular tissue drawn around them. [A beautiful instance in the Mus. St. Thomas's Hospital, shewing the mode employed by nature in sealing up a torn artery, by the drawing over it the surrounding cellular tissue, in a man whose thigh was torn off by a cable. T.]

(3) Shot and other contused wounds of arteries are fatal, because often after eight or more days, when the slough is thrown off, the artery is opened.

(4) *White's* Cases in Surgery, p. 141.—*Bell*, Principles of Surgery, Vol. I. p. 337, 368.—*Pelletan* Clinique Chirurgicale, Vol. I. p. 178.—I have had an opportunity of examining a case in which the coracoid process of the scapula being shot off, had injured the axillary artery and given rise to a false aneurysm on the arm.

(5) The aorta was torn by a piece of bone which had been swallowed sticking in the gullet. v. *Lauren* in Archives générales de Médec. Oct. 1824.

(6) Compare above, § 194. They occur most frequently in consequence of bleeding in the arm over the brachial artery; they occur however accidentally in almost all the arteries, even in the aorta from stabs. v. *Guattani* De externis aneurysmat. Hist., p. 26.—*Pelletan*, Vol. I. p. 92.

(7) Hence arteries, which do not lie in the loose cellular membrane, but being attached to the bones cannot retract, as the A. meningeæ, alveolares, nutritiæ ossium, &c. bleed even for a long time and very much.

(8) Ligatures sometimes produce the closure of an artery in a very short time, and even if the ligature be again loosened. If the artery be tied at some distance from the wound, or the aneurism, there is often danger from a collateral stream of blood, in which case the artery sometimes is only closed at a small point. The closed wounds of arteries in amputated limbs are often consolidated so closely with the cellular tissue of the surrounding parts, that it is impossible to separate them. The most important works on injuries, spontaneous cure, and ligature of arteries, are *Petit* Mémoire sur la maniere d'arrêter les hemorrhages. I. and II. in Mém. de l'Academie des Sc. de Paris, 1731 and 1732.—*Morand* Sur les changemens, qui arrivent aux artères coupées, etc., *ib.* 1726. Hist. p. 58. Mém. p. 321.—*Th. Kirkland*, Essay on the method of suppressing hemorrhages from divided arteries. 8vo. Lond. 1763. — *Pouteau* Mélanges de Chirurgie, 8vo. Lyon, 1760. — *le Comte* Resultats de quelques experiences tentées sur plusieurs animaux, pour faire l'essai de la nouvelle methode de traiter les plaies des artères in Hist. et Mém. de la Soc. Roy. de Médec. 1776, Hist. p. 305.—*Callisen* D. de vulneribus arteriarum. Havniæ, 1788.—*Deschamp* Observ. et Reflex. sur la ligature des principales artères blessées et particulièrement sur l'Aneurysme de l'artère poplitée. 8vo. Paris, 1797. — *Maunoir* Mémoires physiologiques et pratiques sur aneurysme et la ligature. Geneve, 1802.—*Jones*, A treatise on the process employed by nature in suppressing the hemorrhage from divided and punctured arteries, and on the use of the ligature. 8vo. Lond. 1806; 2d edit. 1810, with fifteen plates.—*B. Travers* in Medic. chirurg. Transact., Vol. IV. p. 435, and Vol. VI. p. 632.—*W. Lawrence*, A new method of tying the arteries, &c. *ib.* Vol. VI. p. 155, and Further observations on the ligature of arteries, *ib.* Vol. VIII. Part II. p. 490.—*Béclard* Recherches et Experiences sur les Blessures des Artères in Mém. de la Soc. méd. d'Emulation, 1816, Part II. p. 569.—*A. Scarpa* Memoria sulla legatura della principali arterie degli arti, con una appendice all'opera sull' aneurisma. 4to. Pavia, 1818.—*Vacca Berlinghieri* Me-

moria sopra l'allacciatura dell' arterie. Pisa, 1819.—Lettere del *A. Scarpa* al *Vacca Berlinghieri* sulla legatura delle grosse arterie degli arti e riposta alla midisima di *Vacca Berlinghieri.* 8vo. Pisa, 1820.—*L. Koch* D. de præstantissima amputationis methodo. Landish. 1826, and Ueber die Amputation and die Hinweglassung der Ligatur der Gefässe in *von Gräfe* and *von Walther's* Journ. der Chir. 1827, Vol. IX. p. 560,—*Theoph. Ebel* D. de natura medicatrice sicubi arteriæ vulneratæ et ligatæ fuerint. 4to. Giessæ, 1826, with six plates.

(9) From my observations, I believe that both occur. Experiments on the reproduction of blood-vessels are found in *Cal. Hillier Parry,* An experimental inquiry into the nature, cause, and varieties of the pulse, and certain other properties of the larger arteries in animals with warm blood. Illust. by engravings. London, 1816.—*Ib.,* Additional experiments on the arteries of warm-blooded animals. London, 1819.—*A. E. J. C. Mayer* Disquisitio de arteriarum regeneratione. 4to. Bonnæ, 1823, with engravings.—*G. Salemi* Sull' uso del premi-arterie. Palermo, 1825. —*v. Schönberg* Memorie sul ristabilimeno della circolazione nella legatura o anche recisione del tronchi delle arterie, con le conchiusioni immediate, illustrate da esperimenti e disegni. Napol. 1826.—*A. Zhuber* Neue Versuche an Thieren und deren Resultate über die Wiedererzeugung der Arterien, mit beigefügten Bemerkungen darüber. 8vo. Wien, 1827, with three lithographic plates.

(10) *Scarpa* Sull' aneurisma, p. 230.— *Hodgson,* p. 455 and 467.—*Cruveilhier* Essai sur l'anat. patholog. Vol. I. p. 330, (the cicatrization doubtful.) In one case I found the little opening in the artery produced by bleeding, still open after two months. v. No. 8797, Bresl. Mus.

(11) *Hunter* and *Ev. Home* in Transact. of a Soc. for Improv. of Med. Knowledge. Vol. I. p. 144.

§ 199.

Among the VICES OF TEXTURE of arteries, INFLAMMATION, *arteriitis,*[1] deserves, from its frequency and importance, the first place. This occurs, not only especially in all the blood-vessels of inflamed parts, but also frequently in the arteries alone, especially in the large ones, as an idiopathic or deuteropathic disease. We observe it frequently in inflammatory fevers, in the neighbourhood of local inflammation, in eruptive diseases, in hydrophobia, gout, rheumatism, syphilis, in mechanical injuries of arteries,[2] &c.; and in aneurysm and wounds of arteries it is produced by intentional pressure and ligature, in order to effect the usually consequent adhesion of the vessels. The seat and degree of this inflammation is subject to numerous varieties. Most commonly the inner or serous coat of the artery alone is inflamed, in a greater or less degree, which we distinguish by its more or less intense red colour, greater softness and solubility, by its opacity, its loss of lustre, in the larger arteries by a slight thickening, and especially by a large net-work of vessels spread over the external surface of their fibrous coat. This distinct inflammatory state must not be confounded with the often very similar although generally somewhat dull red colour of the inner arterial coat, which is observed not very unfrequently in a peculiar disposition of the blood to impart colour, in arteries which are putrid, which have been frozen and then thawed, as also such as have been dried by the air,

in asthenic fevers of men and other animals,[3] and, lastly, as consequent on effusion of blood, ecchymosis between the coats of an artery.[4] Phlegmonous or general inflammation of all the coats of an artery is more rare, which we can distinguish, not merely by the already described signs of inflammation of the internal coat, but also by swelling, loosening, more easy separability, and by greater injection of both the outer arterial coats.

(1) *Morgagni* De sed. et caus. morbor. Epist. XXVI. 35; Epist. XLIV. 3.—*J. P. Frank* Epist. de cur. hom. morb. L. I. § 118. — *Schmuck* D. de vasorum sanguiferorum inflammatione. Heidelb. 1793. — *Sasse* D. de vasor. sanguiferorum inflammatione. Halæ, 1797.—*Portal* Cours d'anatomie médicale. Vol. III. p. 127 (on the aorta.)—*Spangenberg* Ueb. die Entzündung der Arterien in *Horn's* Archiv für medic. Erfahrung, 1804, Vol. V. p. 269. — *Testa* On inflammation of the aorta, in his Delle Malattie del Cuori, &c.—*Patissier* in Bulletin de la Faculté de Médec. de Paris, No. 10, 1815, (heart and large vessels.) — *Kreysig* Herzkrankheiten, Vol. II. p. 86, ff; Vol. III. p. 269.—*Hodgson*, p. 3.—*Laennec* De l'auscultation médiate, P. II. p. 353. — *W. Sprengel* in *Rust's* Magazin, Vol. VII. p. 475, (the brachial artery, after injury to the thumb.)—*Bard* in Revue médicale, Mai, 1820, (almost all the arteries.)—*Meli* in Annali univers. di Medic. comp. del *Omodei*, Vol. XVII. and XVIII. Jan.—Jun. 1821, (all the arteries and veins.)—*Jemina de Mondovi* on Aortitis thoracica acuta, *ib.* 1824. —*Montesanto ib.* Vol. XXXVI. No. 5, 1825 (in the aorta, A. innominata, carotis, and subclavia.)—*Bertin* Traité des maladies du Cœur, &c. par *Bouillaud*, Liv. I. Paris, 1824.—*Tanchon* v. Edinb. Journ. of medical science, July, 1816; and *von Froriep's* Notizen, No. 320, p. 183, October, 1826.—*Berard* in D. sur plusieurs points d'anatomie pathologique, No. 3, Paris, 1826. — *R. Bright*, Reports of medical cases, &c. 4to. London, 1827, (three cases.)—*Hinterberger* in der Medic. chir. Zeitung, 1828, p. 31, ff, (the aorta in pregnant and lying-in women.)—*B. Locatelli* D. de Angioitide s. de vascularis sanguiferæ provinciæ inflammationibus. Patav. 1828. — *Gendrin* Histoire anatom. des inflammations. 2 vols. 8vo. Paris, 1826.—[*Elliotson* on Inflammation of the aorta, in his Diseases of the Heart, p. 33. T.]

(2) I consider the inflammation of the artery, especially that of its serous membrane, by no means a rare disease; inasmuch as I have not merely often met with it in dead bodies, the previous state of which I could know nothing about, but also several times in diseases which I had previously conducted. In my younger days I thought I was the subject of aortitis, in consequence of very severe cold, in which a very distinct and painful pulsation of the aorta, high fever, and great sensibility of skin were the symptoms exhibited.—Also in animals, I have several times seen inflammation of the internal coat of the aorta, and of the heart, especially in horses, and most severe in a young horse, which had a large abscess in the thigh. In a few instances, of dogs which had died of hydrophobia, and in one destroyed by inflammation of the heart; and in many foreign animals, which frequently die in menageries, of inflammation of the heart.—In children which have been destroyed by measles and scarlet fever, I have found arteriitis.—*Portal*, after measles —*Testa*, in other eruptive diseases. — *Tanchon*, in fifty persons who died under small-pox, &c.—In syphilitic persons who have taken much mercury, and after catching cold have died of inflammatory diseases, I have twice found inflammation of the inner-coat of the aorta, and of the larger branches springing from it.—*Morgagni*, and Epist. XVIII. p. 27; and *Testa*, have several examples of arteriitis in persons affected with the venereal disease.—Others also have derived arteriitis from syphilis and the use of mercury; viz. *Lancisi* De aneurysmatibus edit. *Lauth*, p. 52. — *Corvisart*, p. 307. — *Richerand* Nosographie Chirurgicale, Vol. IV. p. 74.—*Hodgson*, p. 9.—I have even seen, in phthisis, the internal coat of the pulmonary artery, and of the aorta, inflamed several times; and this once also in a child, in which the greater part of the skin had been scalded with hot water.

(3) Compare above, § 35 and 36, on the redness of the inner-coat of the aorta. v. *Corvisart*, p. 334.—*Hodgson*, p. 7.—*Laennec*, Chap. XVII. p. 353.—*Trousseau* and *Rigot*, in Archives générales de Médecine, Oct. 1826, and July, 1827.

(4) Compare § 37. — Good instances are given by *Boerhaave* Progr. med. Vol. I. p. 242; and Prælect. in Instit. Vol. III. p. 501, No. 827, in a stout ox and in a hunted hare. — *van Swieten* Comment. in Aphorism. *Boerhaavii*, p. 171, in a hunted stag. — *Morgagni*, Epist. XXVI. p. 13; Epist. XXVII. 28, with rupture of the aorta.—*Testa*, p. 210, after violent coughing.—I have myself found such extravasations on the internal coat of arteries in a child which died of whooping-cough; in some asthmatic persons; in one person killed by choke damp, and in some drunkards and hanged people, on the aorta, and sometimes also on the larger branches.—Sometimes I have also found the larger arteries, in amputation, of a bright violet colour, for an inch or two. — I have seen, also in high degrees of inflammation of the aorta, in a few instances, some little drops of pale blood between the coats of the arteries.—*Laennec* found the violet colour produced by ecchymosis, in those persons especially who had died with severe struggles.

§ 200.

A more or less copious EFFUSION OF COAGULABLE LYMPH is a frequent consequence of arterial inflammation. If this occur in and between the coats of the artery, there is often consequently distinct thickening, also an intimate adhesion and consolidation of the three coats with each other, as has been observed, for instance, frequently in aneurysmal sacs; if the exudation occur on the external surface, the artery adheres more or less firmly to the neighbouring parts;[1] should it take place on the internal surface of the artery, it gives rise to obstruction, narrowing, and obliteration or closing of the vessels.[2] The latter is the consequence intended in artificial compression and ligature of arteries, as well as the means whereby Nature herself cures wounds of arteries, and sometimes even aneurysms.[3]

(1) For example, aneurysms with the bones, the air-tube, gullet, &c.—Amputated arteries in the cicatrix with the neighbouring parts.—In one instance the axillary artery was torn in reducing a dislocation of the shoulder, in which it was adherent to the capsule of the joint. v. *Gibson* in Philadelphia Journ. edited by *Chapmann*, Vol. VII. No. 1, Nov. 1823.

(2) I have already described above, § 192, some examples of the spontaneous obliteration of individual arteries. I have also lately found, in the body of an old man, the left subclavian artery very much narrowed, without any distinct cause, but the left carotid completely closed. v. No. 8680, of Bresl. Mus.; and in another case the cœliac artery thickened and completely closed, No. 2266, of my Verzeichn.—*Lardner* in Edinb. Med. and Surg. Journ. Vol. VIII. Part XXVII. No. 4, one carotid artery from pressure of a thickened gullet.

(3) Compare § 198.

§ 201.

The less frequent terminations of inflammation are SUPPURATION and MORTIFICATION. The former appears to occur most commonly, in consequence of chronic inflammation on the innermost coat of hardened arteries, but without the formation of pus, and is thus rather erosion. In this vice is often the origin of mixed aneurysms, as well as of rupture of

arteries. Much more uncommon is the true suppuration of arteries[1] in which the disease is seated, either primarily in the vessels, or more commonly in the parts immediately adjacent to the artery; in both cases the artery is easily perforated by ulceration, and thus gives rise to bleeding,[2] unless the existing inflammation have previously closed the vessel. MORTIFICATION does not appear to occur primarily in the arterial system, indeed the tissue of the artery seems to withstand, for a tolerably long time, the sloughing which affects the neighbouring parts.[3] But if at last the vascular system also runs into sloughing as well as all the other parts, so consequently bleeding would be produced, either by the percolation of the blood towards the softened tissue, even by the incisions often made into mortified parts, finally, by the spontaneous or even artificial amputation of the neighbouring mortified parts; whilst the arteries, by the inflammation preceding gangrene, are sometimes stopped up by a plug of coagulated blood, sometimes are actually adherent and closed.[4] But only in those cases in which a large artery is destroyed on one side by the mortification of neighbouring ulcers, wounds, &c., is dangerous hemorrhage to be dreaded.

(1) *Morgagni* Epist. VII. 9.—*Meckel primus.* in Mém. de Berlin, p.43, 1756.—*v. Haller* Opuscula pathol. Obs. 22, p. 500.—*Weitbrecht* in Comment. Acad. Petropol, Vol. IV. p. 263.—*Scarpa* Sull'Aneurisma reflessioni, &c. translated by *Wishart*, 8vo. Edinb. 1808. — *Recamier* in Journ. de Méd. Chir. et Pharm. Vol. XI. p. 30.—*Lobstein* Compte rendu à la Faculté de Strasb. 1820, p. 114, No. 433, 435 and 437.—I have several times seen ulceration of the femoral artery from suppuration of the inguinal glands. v. No. 2269, my Verzeichniss. Compare *Gendrin*, Vol. II. p. 48.—[In Mus. St. Thomas's Hospital, there is one instance of ulceration of the femoral artery from sloughing bubo, and another from disease of the hip-joint.—*Luke*, wound of carotid? from abscess. v. Med. Gazette, Vol. V. p. 333. T.]

(2) To wit, ulcerous perforation of an aorta not aneurysmal and effusion of blood into the gullet. v. *van Doeveren* Observat. anat. pathol. Obs. 1, with engrav. and *Sandifort* Mus. anat. Vol. II. tab. 105 and 106. — Perforation of the gullet and aorta, in consequence of a piece of money sticking in the former, and effusion of blood into it. v. *Martin* in La Clinique des Hôpitaux et de la Ville, Vol. I. No. 23, p. 30. — The femoral artery. v. *Cruikshank's* Anatomy of the absorbing vessels, &c. 4to. 1786.—The aorta. v. *P. Frank* De cur. hom. morb. L. V. 2, p. 17. — *Fanzago* Osservazione di un ulcere nell' aorta. 4to. Padova, 1816, with engravings; and in Memorie sopra alcuni pezzi morbosi, etc. Fasc. I. p. 7, tab 1. — *Biermayer* Mus. anat. pathol. No. 477, and *Engberg* and *A. Retzius* in Ars. Berättelse om Svenska Läkare-Sällskapets Arbeten, lemnad of *Ekstroem*, 1825. — The coronary artery of the heart. v. *J. Taine* in London Med. Repository, Feb. 1815.—The coronary artery of the stomach, the splenic, and one pulmonary artery. v. *Hodgson*, p. 11.—The femoral artery. v. *B. Travers* in London Med. and Physic. Journ. April and July, 1827, in two instances, and *Gibbs*, *ib.* Aug. 1827.

(3) I have examined the arteries, though slightly, in several cases of fatal mortification of the upper and lower extremities; and indeed, in one case, in which an aneurysma spurium diffusum was fatal from mortification of the arm and the adjacent half of the thorax, by the closest examination, I could not discover any injury of the artery.

(4) Compare especially *J. Thomson's* Lectures on Inflammation, &c. Edinb. 1816, p. 352.

§ 202.

Inflammation of arteries appears to have such consequent vices of texture as answer to the hardening of the other tissues in general, but here exhibits many peculiarities. To these belong the already-mentioned FRANGIBILITY AND DRYNESS of the arterial coats, especially of the innermost, which is then found simultaneously lustreless, often also puckered, discoloured, and easily separable from the other coats; further, there is often very distinct THICKENING and INDURATION of the walls of the artery by the effusion of coagulable lymph into its cellular tissue; next, the conversion of certain spots into a CARTILAGINOUS SUBSTANCE, and, lastly, OSSIFICATION.[1] The latter appears under various forms; thus in rare instances, as little distinct specks of bone in the previously formed plate of cartilage, surrounded by a large vascular circle; or more commonly as a pap-like substance, sometimes white, sometimes yellow, consisting of phosphate of lime and albumen, a milky fluid, very similar to fluid lime,[2] which gradually becomes firmer, leather-like, at last bony; and finally as earthy or gypsum-like small specks and flakes, not unfrequently exhibiting traces of crystallization. These three kinds of ossification often occur at once in a large artery, for instance the aorta, and then at the same time form more or less numerous isolated or closely approximated irregular bony scales, indeed even actual unbroken bony cylinders, which prevent the approximation of a divided artery, and in the application of a ligature on it, break like a cracked eggshell.[3] These ossifications have their original seat always between the serous and fibrous coats of the artery, although in their increasing thickness they destroy by pressure and irritation not unfrequently parts of both coats,[4] so that within they are immediately washed by the blood, and project into the cavity of the artery as irregular plates, generally yellow, or as points and processes, which is often very much narrowed and even filled with them.[5] Ossification of the arteries is but rarely observed in young persons,[6] very frequently, though by no means as a natural condition, in more advanced age,[7] perhaps somewhat more frequently in men than women, and by no means equally common in all parts of the body. Thus we observe, for instance, the smaller much more rarely than the larger arteries, those of the upper less frequently than those of the lower extremities,—very rarely the pulmonary arteries,[8] the arteries of the walls of the chest and belly, and perhaps those of the

alimentary canal and liver are never ossified; on the contrary, commonly the aorta, the angle of the carotids, the arteries of the pelvis, of the brain, of the thyroid gland, the heart, the spleen, kidneys, &c. In beasts also we sometimes find ossification of certain arteries, although less frequently than in man.[9]

(1) *W. Cowper*, On Ossifications or petrifications in the coats of Arteries, &c. in Philos. Transact. 1705, p. 1970.—*Kulmus* D. de tendine Achillis disrupto, et arteriis in osseam naturam conversis. Gedan. 1730. v. *Haller's* Diss. chir. Vol. V. No. 153.—*Crüwel* De cordis et vasorum osteogenesi in viro quadragenario observata. Halæ, 1755, with engravings.—*Haller* Elem. Physiol. Vol. VIII. Part II. p. 80, and Opusc. pathol. Obs. 59.—*Morgagni* De sed. et caus. morbor. on many parts. v. Index. — *Pohl* D. de ossificatione vasorum. Lips. 1774.—*Malacarne* in Osserv. in Chirurgia. Vol. II. Torino, 1784. Art. XII. p. 160, ff.—*J. van Heekeren* De osteogenesi præternaturali. L. B. 1797, p. 116.—*Scarpa*, Sull' Aneurisma.—*Lobstein* Mémoire sur les ossifications des artères in the Mém. de la Soc. des Sc., Agriculture et Arts de Strasbourg, Vol. I. p. 338, ff.—*Lucae* De depositionibus cretaceis intra cordis valvularum arteriarumque substantiam. 4to. Marburg, 1815, and Accelerandæ liter. in universitatibus perfectionis subsidias quasdam commendat et de ossescentia arteriarum senili quædam præfatur. 4to. Marburgi, 1817. — *Cruveilhier* Essai sur l'Anat. pathol. Vol. II. p. 52, ff. — *Hodgson*, p. 19. —*Meckel* Handb. der pathol. Anatomie, Vol. II. 2, p. 183.—*Rosenthal* in *Horn's* Archiv, June and July, 1818.—*Wedemeyer* in *Rust's* Magazin f. d. ges. Heilk. Vol. XIII. p. 194, ff.—*C. H. Ehrmann* Recherches sur la structure, les fonctions et les alterations organiques des Artères. 4to. Strasb. 1822, p. 41.—Many instances of complete ossification of the whole aorta, or of almost all the arteries at once, may be found in *Morgagni*, and in *de Plouquet's* Repertorium, Art. Aortæ et Arteriarum Ossificatio.—A few striking instances of ossified aorta are given by *J. P. Frank* Selbstbiographie, Wien, 1802, p. 57 and 58; Salzb. medic. chir. Zeitung, 1811, Vol. II. p. 185.—*Hagström* in Ars. Berättelse om Svenska Läkare-Sällskapets Arbeten of *Gadelius*. Stockh. 1810.—*Biermayer* Mus. anat. pathol. No. 458.—The Bresl. Mus. also possesses many remarkable cases. Good plates are given in *Baillie's* Engravings, tab. 4, fig. 2, 3.—*Hodgson*, tab. 1.—*J. F. Meckel*, Tab. anat. pathol. Fasc. II. tab. 14, fig. 1—3, tab. 16. — As these calcareous deposits increase the friability of the arterial coats, so also do they frequently give rise to the bursting of arteries, as well as to aneurysm.

(2) Many writers not quite correctly call this a steatomatous, or atheromatous mass.

(3) The cylindrical ossification of arteries is certainly much more rare than the scattered or scale-like; it is, however, by no means so rare as many writers have supposed. I have no inconsiderable number of such arteries of a middling and small size, forming bony tubes nearly a foot long, viz. the femoral artery, the anterior and posterior tibial, the radial, ulnar, &c. I have not found it in the aorta, although it is sometimes so stiff that it prevents flexion of the body.

(4) The distinction between bony concretion and ossification assumed by *Cruveilheir* and *Wedemeyer*, and following them also by *Spitta*, in Die Leichenöffnung in bezug auf Pathologie und Diagnostik, Stendal, 1826, p. 242, is, as is generally the case, so also here, on account of the thinness of the membranes, doubly difficult to make out. It appears to me that the original deposition of lime never takes place in the membrane itself, but in the thin layer of cellular tissue situated on the outside of the serous coat, in which, as in all similar membranes, there is a very large network of blood-vessels. As the bony scales become thicker, the subjacent serous membrane is torn, stretched, and at last is entirely destroyed by erosion. The same also appears to occur on the external surface with reference to the muscular coat, the fibres of which are pressed by the bony mass intruding between them in form of little corns or transverse fibres, are separated from each other, and at last completely wasted; but they never are actually converted into bone any more than other muscles. If the bony scales become still thicker, the cellular coat itself is rendered atrophic. An actual conversion of

the arterial coats into bone, therefore, according to my opinion, never occurs. Oftentimes there are also produced upon the interior of the bony scales already deposited little deposits, somewhat differing in colour, more transparent and very brittle, almost crystaline, the chemical analysis of which is still to be desired.

(5) This in many instances is the cause of gangræna senilis. Compare *Kulmus.*—*Morgagni*, Epist. LV. 26.—*Cowper*, Vol. XXII. p. 1195, and Vol. XXIV. p. 1970. — *Naish*, *ib.* Vol. XXXI. p. 226. — *Rossignolly* in Journ. de Médec. Vol. IX. p. 307.—*Steigerthal* in Phil. Transact., No. 367 and 369.—*v. Mohrenheim* Beiträge zur prakt. Arzneik. Vol. II. p. 214.—*Charitius* Pr. de arteria crurali ossea, per œdema, gangrænamque siccam letali. Viteb. 1798.—*Thomson*, Lectures on Inflammation, 1813, p. 537.—*Hodgson*, p. 41.—*Cruveilheir* Essai sur l'Anat. pathol. Vol. II. p. 57.—*James*, Observation, &c. on Inflammation. Lond. 1821.—*A. Cooper*, Lectures, Vol. I. p. 240.

(6) *Cowper*, No. 299, (in a man of thirty years.)—*Böhmer* Observ. anat. rarior. Fasc. I. Præf. p. ix.—*Penada* Saggio di Osservaz. Vol. II. p. 22. Padova, 1800.—*Portal* Cours d'Anat. médic. Vol. III. p. 133, p. 63.—*Scarpa.*—*Young* found the temporal artery of a child, fifteen months old, completely converted into a calcareous cylinder. v. *Hodgson*, p. 23.—I once found incipient ossification of the aorta in a girl of seventeen. v. Selt. Beob. II. p. 66, No. 29.; also a few times ossification of the cerebral arteries in people about thirty years old. On the semilunar valves of the aorta, and in the ductus arteriosus Botalli, ossification occurs not unfrequently in young persons.

(7) As for instance, *Cowper*, p. 1970, supposed. According to *Baillie.* v. Transact. of a Soc. for the improvement of Med. and Surg. Knowledge, Vol. I. p. 133, it is in persons of sixty years old more frequent than the healthy state; and according to *Bichat*, Anat. gén. Vol. II. in every ten persons of sixty years it occurs in at least seven of them; according to *Lobstein* also it is very common in this class of people. The use of wine, cider and other strong liquors, may in England and France render the deposition of lime in the arteries proportionally more frequent, as it is well known that lithiasis is more common in those countries. Here, in Silesia, ossification of the arteries is much less frequent, according to the reports; even in the West Indies it is said to be still more rare. v. *Stevens* in Med. chir. Trans. Vol. V. p. 34.—In persons who have been subject of syphilis, and are filled with mercury, in gouty people, in those subject to piles, in wine and brandy drinkers, in gourmands, &c. I find it most common. On the contrary I miss it in a great number of very aged persons entirely free from dyscracies; so also we hardly ever find it in very old animals.—In many instances the disposition seems to be hereditary. v. *Testa* Delle Malattie del cuoro, &c. 3 vols. 8vo. Napoli, 1826; and *Kreysig* Die Krankheiten des Herzens, Vol. II. Part I. p. 346. These ossifications do not appear to me to be a mere sign of deficient vital activity in old age. Their increase also, as *Hodgson*, p. 23, has justly observed, is not in proportion to the increase of age; and, as far as we can add, as little in morbid disposition of the body to other ossification. It appears to me much rather the consequence of a peculiar irritation, partly dependent on climate, partly on dyscracy, originating in climate and mode of living, and the so frequent creeping inflammation of the serous coat of the arteries.

(8) *Bichat* improperly denies the existence of ossification in it; in the blue disease, however, the deposition of cartilage and lime in the valves of the pulmonary artery is not unfrequent; other instances also are given by *Riolan* and *Vesling*. v. *Cruveilhier* Essai sur l'Anat. pathol. Vol. II. p. 53.—*Chomel* in Mem. de Paris, 1707, Hist. p. 26.—*Burnet* D. de polyposis concretionibus varior. in pectore morbor. causis. Altd. 1729. — *Pohl* D. de ossificatione vasor præternaturali. Lips. 1774. — *Sandifort* Observ. anat. pathol. L. I. p. 22. —*v. Mohrenheim* Beiträge zur prakt. Arzneik. u. s. w. Vol. II. p. 215. — *Stoll* Ratio Medendi. Vol. I. p. 200.—*Lobstein*, No. 434, in Strasburg Museum.—An instance of this in a young woman who died of consumption, I saw in the Anat. Museum at Freyburg. — A case in an ox. v. *Grimm* in Eph. Nat. Cur. Dec. II. Ann. III. Obs. 38, p. 108.

(9) *Grimm* in Misc. Acad. Nat. Cur. 1684, Dec. II. Ann. III. p. 108, (in oxen.) —In the collection of some Veterinary School, I remember having seen slight

ossification on the aorta of horses; on the cœliac and anterior mesenteric arteries however they occur principally in the horse.—I once saw in an old monkey which died of tubercles, yellow earthy spots on the aorta, and in an old otter a large, prominent, hard pointed bony concretion on the same artery. v. my Verzeichniss, No. 3957.

§ 203.

To the most rare vices of texture which have been observed in the arteries, belong the FUNGOUS LOOSENING OF THEIR INTERNAL COAT, and the various IRREGULARITIES and GROWTHS which project into the cavity of the vessels.[1] If cancer and medullary sarcom of neighbouring parts approach large arteries, these also as well as other structures are affected, and then exhibit TUMOURS of various sizes, especially in their cellular coat.[2] The latter is also the especial seat of ENCYSTED TUMOURS,[3] SCROFULOUS SWELLINGS,[4] and TUBERCLES CONTAINING WORMS,[5] which in rare instances have been found in men and brutes. Finally, the arteries also sometimes exhibit anomalies in respect to their CONTENTS, as in many diseases they, though naturally found empty, contain a considerable quantity of BLOOD[6] even in their larger trunks, or LYMPH in a fluid or coagulated state;[7] in rare cases even WORMS,[8] and loose STONY CONCRETIONS.[9]

(1) It is often very difficult to make out what the ancients meant by excrescences, tubercles, and pustules; they are in reality the deposits of lime already mentioned in the last section; for instance, *Morgagni*, Epist. XI. 15; XVIII. 8; XXVII. 28; LXIV. 5; but in other cases they appear to be true thickenings and growths from the internal coat; to wit, Epist. XXVI. 17; XLIV. 3.—I have myself found several times the internal coat loose and fungous-like, in other instances thick, fleshy, knotty, and hardish. v. also *Hodgson*, Sect. IV. p. 23.—*Adelmann* found a spot on the interior of the pulmonary artery, thickly studded with some firmly attached growths of a bluish green colour, and the size of peas, consisting of a viscid jelly. v. *Harles* Rhein Jahrb. der Medic. und Chir. Vol. I. p. 177.—*Yelloly* found the arteria innominata, the left carotid and subclavian arteries very much narrowed by growths from their internal coat. v. Med. chir. Trans. Vol. XII. Part II. p. 565, with an engraving. — *Hodgson*, p. 18, case third, mentions a growth on the femoral artery, and compares it to the growths on the valves of the heart; but it appears to me nothing more than inflammatory exudation. What was the nature of the pedunculated growth which *Cruickshank* found at the origin of the pulmonary artery, and whether it was situated within or without, I cannot mention, as I cannot find the place.—v. *Soemmerring's* additions to *Baillie's* Morbid Anat. p. 10, note 35. — *Recamier* once found in the subclavian a polypous-like concretion, with a firmly attached extremity. v. *Laennec* De l'auscultation médiate, Vol. II. p. 353.

(2) I have sometimes observed this on the aorta.—In a case mentioned by *Fabriz Hildanus*, the aorta and vena cava were so compressed by a scirrhous tumour that gangrene of the foot took place. v. *Saml. Cooper.*

(3) For instance, in the coats of the aorta. v. *Stenzel* D. de steatomatibus in aorta repertis. Viteb. 1723, and in *Haller's* D. ad morb. hist. et curat. facient. Vol. II.—*Donald Monro* in Med. Essays and Observ. Vol. II. Art. 16, p. 237.—*Sandifort* Mus. Anat. Vol. I. No. 11, p. 242.—*Beauchene* in Bulletin de la Soc. de Méd. App. to the Journ. de Médec. contin. Vol. XI. p. 225. —*Corvisart* Essai sur les maladies du Cœur, 1806, p. 314. — Two examples of encysted tumours, as big as walnuts and oranges, I saw upon the aorta of a horse in the Vete-

rinary School at Munich.—Sometimes encysted and other tumours lying close upon large arteries are mistaken for aneurysms, by the pulsation which they exhibit. I have seen two such cases, one on the neck and the other on the thigh.—A similar case is described by *Tabarrani* Observ. Anat. v. *Haller's* Bibl. chir. Vol. II. p. 249.

(4) I have occasionally seen scrofulous swellings so close to the carotid and aorta, that it was impossible to remove them without injury to the external coat of the vessel. — Perhaps hereto belong the tubercles observed by *Sandifort*, Observ. anat. L. IV. Cap. X. p. 109; and Mus. anat. Vol. I. No. IX. p. 242.

(5) viz. On the anterior mesenteric artery of the horse and ass; on the aorta of a dog. v. *Morgagni* Epist. anatom. Epist. IX. Art. 44—46. Patav. 1764.

(6) The notion that the arteries in death are always emptied of their blood is incorrect; it is by no means uncommon to find a large quantity of blood in them.—I have most frequently observed this in persons who have been hanged, killed by drinking, by fire-damp, after inflammatory and eruptive diseases, in ossified arteries, and in many corpses, in which I could find no sufficient cause. Also in hydrophobia and epilepsy, I have found a tolerable quantity of blood in the arteries.

(7) On these coagula or false polypus, compare § 184.—Also *Palin* and *Knips Makoppe* Epistola de Aortæ polypo. 8vo. Brixæ, 1731.

(8) Compare § 196, note 16. — Perhaps the bloody mass, in which *Rodman* found five living ascarides, (?) was a popliteal aneurysm. v. Edinburgh medic. and surg. Journ. 1814, Vol. X. Part XXXVII. No. 6; in the pulmonary artery of the delphinus phocæna, the strongylus inflexus, *Rud.* has been found sometimes singly, at other times in great numbers.—I found the same in the year 1818, in some porpoises which I dissected at Edinburgh.—They have also been found by *W. Vrolik.* v. Bijdragen tot de natuurkundige Wetenschappen, versameld door *van Hall, W. Vrolik* en *Mulder.* 8vo. Deel I. No. 1, p. 77. Amsterd. 1826; and *v. Baer*, v. Nov. Acta Acad. Nat. Cur. Vol. XIII. Part II. p. 560, note.

(9) In the Anat. Mus. of the Surgical Academy at Copenhagen, I found a round stone, as large as a pea, which, according to the account given, was from the spermatic artery; probably it is a venous stone.—Eight loose stony concretions have, however, been found in an aneurysmal sac. v. *Biermayer* Mus. anat. pathol. p. 101, No. 360, the largest of which is as big as a plum.

Fourth Chapter.

Of the Veins.

§ 204.

The veins[1] are said to be completely and entirely wanting in some monsters;[2] but generally they exist, even when there is neither heart nor arteries, in which case the umbilical vein serving the purpose of an artery divides, and carries the blood directly to all parts of the body, or a kind of *vena cava* is formed, or finally, it goes at once into the principal artery.[3] We not unfrequently observe numerous variations in the veins as to their origin and course.[4] The following are the most important: the coronary vein of the heart opens in the left instead of the right auricle, either alone,[5] or together with the

pulmonary artery,[6] and in one instance into the left subclavian vein;[7] the lesser coronary vein sometimes at once sinks into the right auricle.[8] In imperfect formation of the heart, there arises BUT ONE INDIVIDUAL DISTINCT VEIN FOR THE WHOLE BODY,[9] or the veins of the body and of the lungs already divided spring from one and the same auricle;[10] both *venæ cavæ* are UNITED INTO A SINGLE VENOUS TRUNK from the right auricle;[11] the *venæ cavæ*, with normal position of the great arteries of the heart, sink into the left auricle, whilst the pulmonary veins, on the contrary, proceed to the right.[12] Several times has the *superior vena cava* been found double, whilst the left jugular and subclavian veins united into a single left trunk, which commonly proceeded around the base of the heart in the course of the great coronary vein to the right auricle,[13] or in rare cases to the left auricle,[14] or still more rarely terminated in some other unusual place.[15] The single BRANCHES of the *superior vena cava*, especially the smaller, as the pericardial, the thymic,[16] bronchial, thyroideal, and superficial veins of the neck, &c. are subject to very numerous variations in their origin and course. The hemiazygous vein is sometimes wanting;[17] it and the azygous are double, terminate in the coronary,[18] in the *vena innominata*,[19] and oftener in the jugular and subclavian veins of both sides.[20] The SUPERFICIAL JUGULAR VEIN varies very much, sometimes it is so large that it gives off the greater number of the superficial veins of the face and skull, and forms two or more large trunks on the neck;[21] the DEEP JUGULAR VEIN sometimes divides itself very early into its two larger branches;[22] the VERTEBRAL VEINS are deficient,[23] or on the contrary, they are seen double;[24] the SINUSES of the brain also, in rare instances, vary from what is regular.[25] Of the VEINS OF THE ARM, the subclavian has been once seen double;[26] the cephalic vein is not unfrequently entirely deficient or terminates at the lower edge of the deltoid muscle;[27] the median vein also varies uncommonly, inasmuch as it is not unfrequently wanting, is double, and variously connected with the cephalic and basilic.[28] The *inferior vena cava* has been several times observed very irregular in reference to its origin and course; it sprung, for example, out of the left auricle,[29] or from the *superior vena cava*, whilst it took in its further course, the unusual direction of the azygous and hemiazygous veins;[30] or it did not receive the hepatic veins, so that these entered as a distinct venous trunk into the heart;[31] it was also double or divided unusually high up,[32] its position has also been observed reversed.[33] Of the BRANCHES *of the inferior vena cava*,

the emulgent, the capsular, spermatic and pelvic veins, vary considerably in their origin and number; the DEEP VEINS OF THE LOWER LIMBS are tolerably constant, though the femoral vein, like the artery, divides sometimes higher, sometimes lower, and the veins of the leg vary in a similar manner to the arteries of the same part. The SUPERFICIAL VEINS of the lower extremities vary much more commonly; thus, for instance, the great saphenous vein perforates the femoral sheath at very different parts, in many instances it is lost in a net-work without forming a trunk, in other instances it forms two distinct parallel trunks, it also supplies the place of the lesser saphenous, when, in rare instances, that vessel forms no peculiar trunk, which sinks into the ham.[34] The veins on the foot in which we bleed are as little determinate in their position and connexion, as those on the back of the hand, but are subject to many varieties. The PULMONARY VEINS are sometimes branches of the superior *vena cava*,[35] or arise from the right auricle,[36] or vary in number, so that they are all connected to one trunk,[37] or merely on one or both sides to one common trunk;[38] also five, six, and even seven pulmonary veins occur.[39] I once found a semilunar valve at the opening of a pulmonary vein.[40] In headless monsters the PORTAL VEIN is always entirely wanting, and the veins which it usually forms then arise either from the *vena cava*, or the umbilical vein; in rare cases the portal vein does not terminate in the liver but in the *inferior cava*.[41] The UMBILICAL VEIN also sometimes exhibits varieties, thus, for instance, it is manifold;[42] or it enters the liver at an unusual part;[43] or it sinks into the *vena cava*,[44] into one of the mesenteric veins or into the splenic;[45] sometimes even directly into the heart.[46] In one instance it connected itself with a remarkable branch springing out of the right iliac vein.[47] Sometimes it remains open and carrying blood, for a long time after birth, even in adults.[48] The *ductus venosus arantii* is sometimes entirely wanting;[49] the *vena omphalo mesaraica* was, in one adult, found open and containing blood.[50]

(1) Compare several of the writers quoted on the arteries at § 185.—*de Haller* Pr. de aortæ venæque cavæ gravioribus quibusdam morbis observationes. Gœtt. 1749.—*Delius* Pr. de vena cava plena malorum. Erlang. 1751.—*Puchelt* Das Venensystem in seinen krankhaften Verhältnissen dargestellt. 8vo. Leipz. 1818.—*Gurlt* D. anat. pathol. de venarum deformitatibus adnexo vitii rarioris venæ cavæ inferioris exemplo. 4to. Vratisl. 1819, with lithogr. plates.—*Breschet* Recherches anat. physiol. et pathologiques sur le système veineux et specialement sur les canaux des Os. Liv. I. p. 6. fol. Paris, 1828–29, with plates.—*Stahl* D. de vena portæ, porta malorum hypochondriacorum. Halæ, 1698. — *de Bertholdi* D. primæ lineæ morborum venæ portæ. Viennæ, 1777.

(2) *Schelhammer* in Ephem. Acad. Nat. Cur. Dec. II. Ann. IX. 1690, p. 253, ff.; and *Winslow* in Mém. de l'Acad. des Sc. 1740, p. 817, ff. (both in acephalous monsters.)—*Marrigues* v. Mém. de Mathem. prés. à l'Acad. des Sc. Vol. IV.

p. 123, ff.; and Sammlungen medicin. Gutachten. Leipz. 1776, p. 276, ff, (in children without hearts.)

(3) Compare *J. F. Meckel* Handb. der pathol. Anatomie, Vol. I. p. 162, ff.—*Tiedemann* Anatomie der kopflosen Missgeburten. fol. Landshut, 1813, § 75, p. 96, ff.—*Elben* D. de acephalis s. monstris corde carentibus. 4to. Berol. 1821, p. 108, ff.

(4) *J. F. Meckel*, Ueber den Verlauf der Arterien und Venen, in his Deutschen Archiv f. d. Physiologie, Vol. I. p. 285, ff., endeavours to make out the rarity of venous in comparison with arterial variety; but I cannot agree with this opinion, as the number and difference of the varieties are really much greater than are there mentioned, and the comparison of the variation of the vessels arising from the aorta, No. 4—19, with the single duplication of the superior vena cava, does not appear to me quite correct, as the branches which arise from the venæ innominatæ, and the commencement of the thyroideal and subclavian veins, certainly do not vary less frequently than the arteries which have been named. But as to the middle and smaller veins, especially the cutaneous, these run into an endless variety, so that I can boldly assert, of the superior thyroideal, the veins at the bend of the elbow, and on the back of the hand, they are never, even in a single person, the same on both sides in the same individual. Two supernumerary venous trunks (which?) are described by *Menieres*, in Archiv. génér. de Médec. Vol. XI. March, 1826.

(5) *J. F. Meckel* Handbuch der Menschl. Anat. Vol. III. p. 67.

(6) *Lemaire* in Bulletin des Sc. med. 1810, Vol.V.; there opened two coronary veins into the pulmonary artery; in another case, the large coronary vein was entirely deficient, the middle opened in the left superior cava, and a third, coming from the under part of the heart, terminated in the right auricle, by one of the thebesian openings. v. *Murray*, in Svenska Vetensk. Academiens nya. Handlingar, 1781, Part IV. p. 282.

(7) *Le Cat* in Mémoires de l'Acad. des Sc. 1738, Hist. p. 62.

(8) I found this twice. *Murray* once saw, in deficiency of the great coronary vein, a coronary vein open immediately in its stead; v. *A. Murray* in Svenska Vetensk. Academ. nya. Handl. 1781, p. 282.

(9) For instance, *Roederer* in Comm. Soc. Gotting. Vol. VI. p. 125.—*Mayer* in *v. Graefe* and *v. Walther's* Journal d. Chir. Vol. X. p. 44, ff. — *Cerutti* Rarior. monstri, in museo anat. Lipsiensi adservati, descriptio anat. 4to. Lips. 1827.

(10) *Standert* in Philos. Transact. 1805, Part II. p. 228.—*Meckel* Handb. d. pathol. Anatomie, Vol. II. 1, p. 52, (in a double monster.) — *Farre* Pathol. Researches, Essay I. Malformations of the human heart, p. 2, Lond. 1814.—*Fleischmann* Leichenöffnungen, p. 197.—*Mauran* in Philadelphia Journal, Vol. XIV. p. 253.

(11) *Wichert* Descript. monstri duplicati. 8vo. Dorpat, 1824, p. 25 and 27.

(12) I observed this in a double human monster, No. 8014 of Bresl. Mus. yet to be described.

(13) *Bartholinus* Histor. 84, Cent. II.—*Theune* præs. *Boehmer* D. de confluxu trium cavarum in dextro cordis atrio. 4to. Halæ, 1763, with plates; and *Boehmer* Observat. anat. rarior. Fasc. I. Præf. p. xii.—*A. Murray.*—*J. F. Meckel*, four cases. v. Handb. der pathol. Anat. Vol. II. 1. p. 125.—Tabulæ anat. pathol. Fasc. II. tab. 10, fig. 6 and 7; and Archiv f. d. Physiol. Vol. IV. p. 479.—*Béclard* in *Leroux* Journ. de Médecine, Vol. XXXVI. p. 115.—*Weese* D. de cordis ectopia. Berol. 1819. p. 30. tab. 6.—*Küstner* in Bereicherungen für d. Geburtshülfe, etc. by *Choulant*, *Haase*, *Küstner*, and *Meissner*, Vol. I. p. 50, (this is the same case described by *Weese.*)—*Bock* in *Cerutti's* Pathol. anat. Mus. Vol. I. Part III. p. 50.—Myself in three instances. v. My Selt. Beob. Vol. II. p. 69; and Verzeichniss, No. 2874.—*Hesselbach* Beschreibung der pathol. Präparate zu Würzburg, p. 229.— *Wirtensohn* D. duor. monstror. duplicium humanor. descript. anat. p. 22. 4to. Berol. 1825.—*Wehrde* D. anat. pathol. de monstro rariore humano. p. 11. 8vo. Halæ, 1826.—*Breschet* Recherches anat. physiol. et pathol. sur le Systême veineux, etc. L. I. p. 2. Paris, 1827.

(14) *Breschet* in Répertoire général d'anat. et de physiol. pathol. Vol. II.

p. 12; in another case, in the left side of the single auricle, p. 17.—*Barkow* Monstra animalium duplicia, Vol. I. p. 16. 4to. Lipsiæ, 1828.

(15) For instance, in the right auricle, close to the right upper vena cava.—v. *Hesse* D. Monstri bicipitis descriptio anatomica, p. 21, tab. 2. 8vo. Berol. 1823. In another case, both the superior venæ cavæ joined each other very shortly before their entrance into the right auricle, but had there two distinct orifices.—*Rosenthal* Abhandl. aus dem Gebiete der anatomie, physiologie, und pathologie, Berlin, 1824, p. 150; or in the inferior vena cava. v. *Niemeyer* D. singularis in fœtu puellari recens editio abnormitatis exemplum. p. 7, 4to. Halæ, 1814.

(16) One thymic vein, as large as a writing-quill, sunk at once into the right auricle of a child affected with the blue disease. v. *Marechal* in Journ. général de médecine, Vol. LXIX. p. 354.

(17) *Sömmerring* Vom Bau des menschlichen Körpers. 2d edition. Vol. IV. p. 470.

(18) Compare *Haller* Elem. physiol. Vol. III. sect. I, p. 107; and *Wrisberg* Observationes anatomicæ de vena azyga duplici aliisque hujus venæ varietatibus. Goett. 1778, rev. in Sylloge Diss. p. 127.—I, as well as many others, have several times found both veins entirely or partially double; the latter is also engraved by *Mascagni* in Vasor. lymphat. c. h. historia et ichnographia, Senis, 1787, pl. 19.

(19) *Sylvius* Vesani calumniarum depulsio XVII. in Op. p. 144. — *Le Cat* in Mémoires de Paris, 1738, Hist. p. 62, (with one branch in the right and the other in the left auricle.)—*Sömmerring* p. 469; the hemiazyga in a cat, in the left auricle. v. *Barkow*, Vol. I. p. 115.

(20) The vena azygos in the right subclavian. v. *Wrisberg*, (by a canal in the upper lobe of the right lung.)—*Breschet*, p. 12, ff. 16. I once observed a similar case in a man. The vena azygos very rarely terminates in the lower vena cava, within the pericardium, v. *Soemmerring*, p. 474; or in the upper cava, v. *Cheselden*, in Phil. Trans. Vol. XXVIII. No. 337; or in the right vena innominata, v. *Wrisberg*, p. 136, and *J. F. Meckel* Handbuch der menschl. anat. Vol. III. p. 350. More frequently the vena hemiazyga, instead of going into the vena azygos, empties itself through the left superior intercostal vein, into the left subclavian, which I have seen several times, as also have *Wrisberg*, *Fleischmann* Leichenöffnungen, p. 228; *J. F. Meckel*, p. 350. In some of these instances, the vena hemiazyga has also terminated in the azyga; the hemiazyga sometimes terminates in the thyroideal vein. v. *Cerutti* Beschreibung der Pathol. präparate zu Leipzig, No. 765 and 766. I have also once seen it terminate in the azygous and the left subclavian, at the same time; in one case, in which the inferior cava extended upwards, the hemiazyga terminated in the left vena innominata. v. *Wistar*.

(21) *Lauth* Spicilegium de vena cava superiore, p. 47. 4to. Argentor, 1815.

(22) *Columbus* De re anat. L. XV. p. 487, found it double; I have seen it a few times divided below the larynx; *Cerutti* observed the same, No. 764.

(23) At the same time in monsters with deficient brain and cleft spine. v. *Rossi* in Mémoires de Turin, 1800, Vol. VI. p. 18.

(24) *Sandifort* in Obs. anat. pathol. L. IV. cap. 8, p. 98.

(25) It is said that in one case, one sinus transversus was deficient. v. *Lieutaud* Essai anatomique, p. 385, and one sinus cavernosus. v. *Santorinus* Observat. anat. p. 72; more frequently the smaller is deficient, or double, even the sinus falciformis major has been observed in part double. v. *Haller* Elem. physiol. Vol. IV. p. 147; and *Vicq d'Azyr*, tab. 32.—A remarkable sinus on each side, from the sinus transversus passing over the petrous bone, and through the middle cavity of the skull into the orbit, was seen by *Kelch*, Beiträge zur pathol. Anatomie, Berlin, 1813, p. 80, No. 56.—I once found the transverse sinus connected, by an unnatural large hole in the skull, with the external cranial veins, almost as is regularly the case with mammalia. v. My Selt. Beob. Part II. p. 69, No. 31, 6.

(26) *Morgagni*, Epist. LXIX. 2.

(27) In almost every winter, I have seen once or twice the cephalic vein wanting from the shoulder to the elbow.

(28) Sometimes a large venous trunk passes from the median vein between the cephalic and basilic, some way upwards towards the shoulder, in one or other or in both of which it terminates.

(29) *Ring* in Med. and Physic. Journ. Vol. XIII. p. 120.—*Lemaire* in Bulletin des Scienc. médic. Vol. V. 1810.—*Breschet*, p. 20, (it passed into the belly on the left side of the aorta.)

(30) *Cheselden* in Philos. transact. Vol. XXVIII. No. 337. —*E. Wistar*, A system of anatomy, for the use of students of medicine. Philadelphia, 1811-14. Vol. II. p. 320.—I saw a similar instance at Professor *Jeffray's*, at Glasgow, and myself found a third case. v. *Gurlt.* p. 20, with a plate, my Selt. Beob. Part II. p. 67; and Verzeichniss, No. 2048. — *Herholdt* in Abhandlungen der k. Akademie zu Kopenhagen, 1818; and in two unpublished plates, very kindly presented to me, the inferior cava passes from the right side, in spite of the convolutions of the intestines, and terminates above in the superior cava, which lies on the left side.— *Weber* in *Rust's* Magazin f. d. ges. Heilk. Vol. XIV. p. 536. Here, perhaps, belongs also a case of unusual arrangement in the ascending cava, and the external jugular veins, by *W. Horner*, in Journ. of the Acad. of natural Sciences of Philadelphia. Vol. I. P. II. p. 407, with engravings.

(31) *Rothe* in Abhandl. der Joseph. Akademie, Vol. I. p. 265, pl. 4, (in the upper part of the right ventricle, in which there were three valves), re-engraved in *Meckel*, Tab. anat. pathol. Vol. X. fig. 9 and 10.—*Breschet*, p. 14 and 20, (in the first case, the hepatic vein terminated in the left, in the second, in the right auricle; an approximation to this formation is, when the hepatic veins perforate the diaphragm, and empty themselves above it into the inferior cava.) v. *Morgagni* V. 6, 9; LX. 6.—*Huber* Observat. aliquot anat. p. 24, Cassell, 1760, rev. in *Sandifort's* Thesaur. Vol. I. p. 306.—In the case mentioned in the preceding note, the hepatic vein passed as a narrow trunk to the right auricle; and in the case mentioned by *Wistar*, as two trunks; in the cases related by *Weber*, however, it was connected with the inferior cava by an unusual branch; —in the instances given by *Herholdt*, it proceeded in spite of the convolutions of the intestines into the right atrium.

(32) *Petsche* Sylloge observ. anat. rev. in *Haller's* Diss. anat. Vol. VI. No. 77. *Timmermann* De notandis circa naturæ humanæ machinæ lusus, p. 54, Duisb. 1750. — *Wilde* De vena cava duplici ascendente in Commentar. Acad. Petropol. Vol. XII. p. 262, with an engraving, which is copied in *Meckel's* Tab. anat. pathol. Fasc. II. tab. 10, fig. 8.—*Lobstein* Compte rendu, etc. Strasburg, 1820, No. 469. (divided from the kidneys downwards.)—A similar case is described by *Zagorsky* in Mémoires de l'Acad. imp. des Scienc. de Petersbourg, 1822, Vol. VIII. p. 289. —*Meckel* in Anat. physiol. Beobachtungen und Untersuchungen, p. 87, and my Selt. Beob. Part II. p. 70, No. 31.—In a dog. v. *Kerckringii* Spicilegium anat. Obs. 29, tab. 11. — As a first step to division of the inferior cava, we sometimes observe a thin venous trunk, which passes on the left side of the aorta, springs from the vena iliaca, and usually terminates in the renal, although also in the cava itself. Such cases were seen by *Morgagni*, Epist. XLVII. 30.—*Pohl* De venar. variet. 1773.—*Meckel* often. v. Handb. der menschlichen Anat. Vol. III. p. 358, and myself once.

(33) It passes upwards on the left side of the aorta and just close beneath the diaphragm turns to the liver. v. *Morgagni* Epist. LVI. 31.—*H. L. Franke* in Der Dresdner Zeitschrift für Natur-und Heilkunde. Vol. V. Part II. (the preparations are to be found in Anat. Mus. of the Chir. Academy of Dresden.)

(34) Which I have sometimes seen.

(35) *Wilson* in Philos. Trans. 1798, Part II. p. 346.—*Meckel* Tab. anat. pathol. Fasc. II. tab. 9, fig. 2, (the superior right.)—*Breschet*, p. 13, (from the double superior cava.)—An anastomosis between the superior cava and superior right pulmonary vein was seen by *Winslow* in Mémoir de l'Academ. R. des Scienc. 1739, p. 113.

(36) *Weese* D. de cordis ectopia, p. 29. Berol. 1819, (the right superior.)—*Breschet* p. 20, (the right pulmonary vein.)

(37) *Lemaire* in Bulletin des Sc. médical. Vol. V. 1820. — *Wichert* Descriptio monstri duplicati, p. 25. 8vo. Dorpati, 1824.

(38) From each lung only one vein was seen to come, by *Haller* De corp. hum. part. fabrica. Vol. II. p. 1231. — *Sandifort* Observ. anat. pathol. L. IV. cap. 8. p. 97. — *Portal* in Mém. de l'Acad. de Scienc. 1771. Hist. p. 74. — *Schuler* D. de morbo cœruleo, p. 12. Œnipont. 1810. — *J. F. Meckel* Handb. der pathol. Anat. Vol. II. 1, p.133.—*Rust's* Magazin f. d. gesam. Heilk. Vol.XVIII. p. 346.—*Bock* in *Cerutti's* Pathol. anat. Museum, Vol. I. Part III. p. 37, ff. — *Ramberg* D. de corde vasisque majoribus, etc. p. 21. 8vo. Berol. 1824, ff. — Myself in a double monster of a sheep with one heart. v. No. 8020 Bresl. Mus. — Sometimes the pulmonary veins were connected only on one side in a single trunk. v. *Löseke* Obs. anat. chir. med. p. 26. Berol. 1754, (left.)—*Sandifort*, Lib. III. cap. 1. p. 18, tab. 6, fig. 4, (left.) — *Pohl* Observ. angiol. de venis. Lips. p. 11.—*J. F. Meckel*, (left.)—*Nasse* Leichenöffnungen, 1te Reihe, p. 1661.—*Delmas* in Ephem. médicales de Montpellier, Vol. I. Jan. 1826, (only one right.)

(39) I have several times seen five pulmonary veins, and always three on the right side; the same was seen by *Meckel* in Mém. de Berlin, 1750, p. 167.—*Haller* De corp. hum. fabr. Vol. II. p. 123. — *Portal* in Mém. de l'Acad. des Sc. de Paris, 1771, Hist. p. 74.—*J. F. Meckel* Handb. der menschl. Anatomie, Vol. III. p. 370, (in two cases, three pulmonary veins on the right, and, in one instance, the same on the left.—Six pulmonary veins, of which four were on one side, were found by *Sandifort* L. III. 41. IV. 97; seven described by *Müller* D. exh. syllogen observation. quarund. anatom. Giessæ, 1760. v. *Voigtel* Handb. der pathol. Anatom. Vol. I. p. 478.

(40) *Kelch* Beiträge zur pathol. Anatomie, No. 59, p. 81.

(41) *Abernethy* in Phil. Transact. 1793, P. I. p. 59; and in *W. Saunders*, On the Liver, p. 59, London, 1793. — *Lawrence* in Med. chir. Transact. 1814, Vol. V. p. 174; in one case it perforated the diaphragm, and terminated within the chest, in the inferior cava. v. *Huber* Observat. anat. p. 34. — [Vena portæ terminating in the vena cava. v. *Wilson*, in Med. Gazette, Vol. VIII. p. 443. T.]

(42) *Sandifort* L. III. p. 33.—In human double monsters, with only a single navel-string, two umbilical veins are often found, which, sooner or later, though not always, become united. In double monsters of cattle and sheep, which regularly possess two umbilical veins, I have often found three, and even four, within the navel-string.

(43) I have several times seen, especially in children with cleft abdomen, large umbilical and frenic rupture, with dislocation of the liver, the umbilical vein entering at the edge and even on the upper surface of the liver. The latter has also been observed by *Breschet*. v. Med. chirur. Transactions, 1818, Vol. IX. p. 433.

(44) *Rosenthal* Abhandlungen aus dem Gebiete der Anatomie, Physiologie und Pathologie, p. 150, Berlin, 1824, (in a fœtus, with umbilical rupture in the inferior cava.)—*Littre* in Mém. de l'Acad. des Sc. p. 10, 1709, (it principally formed the inferior cava, perforated the diaphragm distinct from the hepatic veins, and terminated in the superior cava.)—*Weese*, p. 22, one branch from it into the liver, the other into the superior cava.

(45) By one branch into the liver, by the other into the mesenteric vein. v. *Kerkring* Spicil. anat. p. 80, Obs. 37. — In the splenic vein. v. *Fingerhuth* in *Meckel's* Archiv für Anat. und Physiologie, 1824, No. 1, p. 111, (in a calf with deficient abdominal parietes, pelvis and hinder extremities.)

(46) Above the liver, directly in the right auricle. v. *Mende* in Nov. Actis phys. med. Acad. N. C. 1821, Vol. XIII. Part II. p. 869, pl. 46.

(47) *Serres*. v. Archives générales de Médecine. Dec. 1823.

(48) *Kerkring* Spicil. anat. p. 21, Obs. 7. — *Haller* Elem. Physiol. Vol. VI. p. 483.—*M. Hoffmann* in Ephem. Acad. N. C. Cent. IX. and X. p. 443. — *Powel* Treatise on the Bile.—My Selt. Beob. Part II. No. 31, p. 71, and Verzeichniss, No. 2273, (in a man of fifty years, the umbilical artery also was still open.)

(49) *Sömmerring* Vom Bau des menschlichen Körpers. 2d edit. Vol. IV. p. 485.—*Küstner* in his and *Choulant's*, *Hase's*, and *Meissner's* Bereicherungen f. die Geburtshülfe, u. s. w. Vol. I. p. 52.—As I have myself examined the just-mentioned fœtus, I can confirm this observation.—I have three times besides

seen the ductus venosus deficient in similar cases; in which, however, the umbilical vein entered the liver in unnatural situations.

(50) *G. Spangenberg* in *Meckel's* D. Archiv f. die Physiologie, Vol. I. p. 87.

§ 205.

The SIZE and FORM of the veins, as might be expected from the great pliancy of their walls, are subject to frequent variations. There are some individuals, in which, as a congenital and even hereditary peculiarity, the whole system of blood-vessels, and thus also the veins, is very NARROW. In great deficiency of blood throughout the body, in the diminished circulation of wounded, paralytic, and indurated parts, in continued pressure,[1] in amputated limbs, &c. the veins are often very remarkably NARROWED. More frequent, however, the opposite state, or the UNNATURAL ENLARGEMENT of the veins, which is sometimes general, sometimes only local, and especially caused by frequently recurring congestion in a part, by the various obstructions to the circulation of the blood, for instance, vices of the heart and lungs, compression or obliteration of the greater venous trunks,[2] &c. as well as by a state of too great laxity and torpor of the venous coats. In telangiectasy, there is a peculiar degeneration of the blood-vessels connected also with widening of the smaller veins.[3] If the diseased extension of the veins be continued, partial, and considerable, we give it the name of BURST-VEINS, BLOOD-KNOTS, *varix*, *cirsus*, *phlebeurysma*,[4] &c. This occurs in women, especially in pregnancy,[5] and more frequently than in men;[6] it occurs sometimes throughout the body,[7] but most commonly in the superficial veins of the lower extremities[8] and lower part of the belly, in the female generative organs, in the spermatic cord, in hemorrhoidal disease on the urinary bladder and rectum, and on the venous plexuses of the brain. Sometimes the *varices* occur simultaneously on several parts in the same individual, thus they often form on the *vena saphena* a prominent series of swellings; the form of these vascular swellings, which are often very large, is usually that of knots, although in many cases, if the veins are simultaneously very much elongated, winding like intestines, and large lobulated or grape-like tumours, which at first are soft and easily emptied by pressure, but in time become more solid, whilst their coats are thickened by inflammation, and their cavities either entirely or partially filled with fibrous matter. *Varices* also occur in brutes, although much more rarely than in man.[9] A peculiar kind of venous swelling is the already described *varix aneurysmus*,[10] or *aneurysma varicosum*, in

which the extension of the vein is produced by the influx of the blood from the adjacent wounded artery.

(1) For instance, by aneurysm, which I have a few times seen on the superior vena cava, once on the v. subclavia, and a few times on the v. cruralis and poplitea. — *Hunter*, v. Med. Obs. and Inquir. Vol. I. p. 333, found the v. cava superior, subclavia, and thyroidea, extensively compressed by an aneurysm.—Similar cases were observed by *Corvisart*, Sur les Maladies, &c. du Cœur.—*Bertin* Traité des Maladies du Cœur, p. 137.—They are not unfrequently compressed by tumours of the lymphatic glands; this was observed by *Bleuland* on the superior cava, v. De difficili aut impedita alimentorum depulsione, L. B. 1780, and myself twice on the deep thyroid and crural veins; lastly, tumours of other kinds, as I have myself seen, may occasionally compress the venous trunks.

(2) I have several times observed this to a great extent in diseases of the lungs and heart, both in the cavæ and their large branches, as well also, as though more rarely, in the pulmonary veins; also, in the blue disease, I have several times noticed great expansion of the veins. v. *Pozzis*, v. *Senac* Sur la structure du Cœur. Vol. II. p. 414, ff.—*Haase* D. de morbo cœruleo. Lips. 1813.—The expanded jugular veins in many diseases are seen pulsating strongly.—Comp. *Morgagni*, Epis. XVIII. p. 9.—If the cavæ, or other large veins, are very much narrowed, or completely closed, the circulation can be restored by the expansion of the neighbouring small veins. I have twice found this in great compression of the inferior cava from tumour of the liver; and in a third case, in consequence of closure of the superior cava, the v. azyga, hemiazyga, and mammariæ, remarkably large; the same occurred in the cases of obliteration of the inferior cava, to be mentioned further on. Whether the enlargement of the veins in the neighbourhood of cancerous tumours, medullary sarcoma, osteosarcoma, large aneurysms, &c., arises from pressure on the veins, or from disease in themselves, I do not venture to decide; I could, however, almost always refer it to pressure.

(3) Compare above, § 193.

(4) *Mancinus* Tract. duo, alter de varicibus, alter de reficiendo naso. 8vo. Francof. 1586.—*Rolfink* D. de articulor. doloribus, varicibus, etc. Jenæ, 1637.—*Seger* D. de aneurysmate venarum s. varicibus. Basil, 1661. — *Fehr* in Misc. Acad. N. C. 1675 and 1676, p. 55; 1699 and 1700, App. p. 162.—*Miller* D. de varicibus, Altdorf, 1680.—*Stammell* D. de tumoribus varicosis. Mogunt. 1789.—*Wedel* D. de varice. Jenæ, 1699.—*Pohl* D. de varice interno, morborum quorundam causa. Lips. 1785; and *J. Coquart* D. de varicibus. 4to. Paris, 1786.—*de Plouquet* De phlebeurysmate s. varice. Tubing. 1806.—*Graefe's* Angiektasie. Leipzig, 1803.—*Brodie* in Medico-chir. Transact. Vol. VIII. Part I. p. 195.—*Volpi* in Saggio di osservazioni, etc. Vol. II. Phil. 1814.—*Delpech* Traité des maladies chirurgicales, Vol. III.—*Carmichael* in Transactions of the Fellows of College of Physicians in Ireland, Vol. II. p. 345.—*Briquet* in Archives générales de Médecine, Vol. VII. Febr. and March, p. 200 and 396.—*J. Csorba* D. de Phlebeurysmate, in specie de hæmorrhoidibus. 8vo. Pesth. 1817.—*Heisterbergk* D. de varicibus. 4to. Lips. 1824.

(5) *Haase* and *Richter* D. de gravidarum varicibus. Lipsiæ, 1781.—*Birkholz* D. de quibusdam gravidarum varicibus. Lipsiæ, 1782.—*Lützelberger* D. de symptomatibus quibusdam gravidarum præcipue de varicibus atque œdemate pedum. Jenæ, 1791. — *Brasse* D. de varicibus præsertim gravidarum. 4to. Berol. 1819, with engravings.

(6) In a man of forty years old and in poor health I saw almost all the cutaneous veins of one lower extremity exceedingly varicose. I have also several times seen little varices on the vena saphena of men.—*Hodgson*, p. 542, case 51, describes large varices on the vena saphena of a man.

(7) Besides the already mentioned parts, I have also seen it sometimes on the veins of the heart in aneurysm, once in the vena cava, once in the orbit as large as a hazel-nut, and occasionally in the œsophageal veins, although not very large.—*von Siebold* found a considerable varix in the orbit. v. Salzb. Med. chir. Zeitung, 1813,

Vol. II. p. 199.—*Frank* observed it on the lips, the palate and the cheek. v. De cur. hom. morb. L. V. 2. p. 57.—*Dzondi* Lehrb. der Chir. Halle, 1824, p. 395, saw one as large as a hen's egg in the jugular vein; they are very rare on the arm, although *Petit*, in Traité des maladies chirurgicales, Vol. II. p. 49, has described a case.

(8) A very beautiful engraving of varicose veins on the thigh is given by *Alibert* in his Nosographie Naturelle, Vol. I. pl. 4.—*Ghidella*, in Nuovi Commentarj di Medicina e di Chir. 1819, Vol. III. Part I. gives a very remarkable instance of the whole v. saphena varicose, and thicker than one's thumb, with a varicose tumour in the ham: a varicose expansion of the v. saphena confounded at its upper extremity with a rupture, is described by *J. L. Petit* v. Dict. des Sc. Médic. Vol. XLIX. p. 573.

(9) I have seen it only in the horse in the jugular vein and on the prepuce;—a varix as large as a hen's egg was observed on the transverse sinus of the brain in a horse. v. Journ. gén. de Médec. p. 285, May, 1821.

(10) Compare § 194.

§ 206.

The great extension to which varicose veins are subjected sometimes gives rise to BURSTING OF THEIR SWELLINGS.[1] Various VICES OF CONSISTENCE, however, a ssuppuration and sloughy softening, and in the healthy state of veins, great congestion of blood, violent muscular exertion, ague, &c. also give rise to SPONTANEOUS RUPTURE, which, however, is more rare than in arteries.[2] If it occur in the small and deep-seated veins, spots and bloody swellings arise, which latter may, under some circumstances, be mistaken indeed for aneurysm;[3] the bursting of larger veins is naturally sometimes fatal. Sometimes the umbilical vein again opens itself several days and even weeks after birth, and causes dangerous and mortal hemorrhage.[4] Not very rarely injuries of veins arise from mechanical injuries not penetrating, but rather by concussion.[5] WOUNDS OF VEINS,[6] if they be not mortal from effusion of blood, are readily healed, not merely by closing of the vessels, but if the wounds are not large, and especially, if they be longitudinal, even by adhesion and cicatrization, in which they differ remarkably from those of arteries.

(1) Sometimes with fatal consequences. v. Commerc. Liter. Noric. 1734, p. 116.—*Morgagni* Epist. XXVI. 29, (the vena azygos.)—*Michaelis* in *Richter's* chir. Bibliothek, Vol. V. p. 123, (the vena jugularis.)—*Portal* Cours d'Anat. médic. Vol. III. p. 354, (the subclavia,) p. 373 (the vena azygos.)—*Cline* v. *Hodgson*, p. 538, (the vena jugularis interna.)—*Amussat* and *Murat* in Revue médic. franç. et étrang. 1827, Vol. IV. (the vena saphena); compare *Haller* Elem. Physiol. Vol. I. p. 130, note 9; a fatal rupture of a varicose plexus pampiniformis was seen in a young woman by *Fleischmann*.

(2) Spontaneous ruptures of the v. cava observed by *Aretæus* De caus. et sign. morbor. acut. Lib. II. cap. 8.—*Laurentius* Hist. anat. h. c. Lib. IX. qu. 18.—*Hacquinet* v. Eph. N. C. Dec. I. A. 1. Obs. 101.—*Puerarius* ad *Burnet* Thes. med. Lib. III. p. 58.—*Lancisius* De subitan. mort. Obs. phys. anat. 5.—*Fantoni* ad *Morgagnum* Epist. VIII.—*Senac, Lieutaud.* v. *Portal*; in which he describes two of his own cases.—*Th. Bartholinus.* v. Misc. Acad. N. C. A. I. 1670, p. 233, 1671, App. p. 24.—*Schenck* Observat. Lib. III. Part II. Obs. 50, 51.—*S. Nebel, ib.* 1695 and 1696, p. 120.—*L. Bourgeois* Observ. sur la sterilité, etc.

Lib. I. p. 221, (the inferior.) — *de Haen* Ratio Medendi, Vol. IV. Part X. pl. 1, § 3, p. 391.—*Salzmann* D. morte subita ex sanguine in pericardium effuso. Argentor. 1731.—*Doubleday* in Med. Observat. by a Soc. of Physic. in London, Vol. V. p. 144.—*L. Lovadina* Memorie scient. e letter. dell' Ateneo di Treviso, 1817, Vol. I. p. 251 (both cavæ in mortification on account of an extraneous body sticking in the gullet.—*Nasse* Leichenöffnungen, 1st Reihe, p. 85, (the inferior in the chest.)—*J. Kennedy*, On Ruptures of the Vena Cava in London medic. Repository, Vol. XX. Octob. 1823 (with copious references and two cases of his own.)—*Dommanget* in Journ. gén. de Méd. Août. 1824, (the inferior in the chest.)—*Seymour* in Lond. med. and phys. Journ. — *Larrey*, in the Journ. de la Gironde, in *v. Froriep's* Notizen, 1827, No. 365, p. 206, (the inferior,)—the inferior in a horse. v. *Grognier* in Correspond. vétérin. Vol. II. p. 97; and in Journ. de Médec. contin. Dec. 1810, p. 804.--Spontaneous rupture of the pulmonary veins was seen by *Bellini* De morb. pector. and *Franc. Queye* Disp. de Syncope, C. III. Prop. 2.—Compare *Morgagni* Epist. XXVI. 27.—*Portal* Mémoir. de Paris, 1784.—Compare Auserl. Abhandl. f. prakt. Aerzte. Vol. XII. p. 724, (the coronary veins of the heart in aneurysms.) v. *Bertin* Traité des maladies du Cœur. Paris, 1824, p. 417. — The jugular vein. v. Breslauer Sammlungen, Aug. 1726, p. 254: and frequently in horses from Moldavia, Wallachia, Tartary, &c. in summer, as I have several times seen.—On the cheek. v. *Haller*, note.—The sinuses of the brain. v. London medic. Repository, Vol. V. Part I. No. 25, (the sinus longitudinalis.) *Ib.* Vol. X. Dec. 1828, (both transverse sinuses.)—*Portal*, Observat. sur la nature et la traitement de l'Epilepsie. 8vo. Paris, 1827.—*Douglas* in Edinb. medic. Essays and Observat. Vol. V. Part II. p. 602, an effusion of blood on the occiput caused death, on account of its connexion by a hole in the skull with the sinus. v. *Flint*, in New-England Journal of Medic. and Surgery, new series. Vol. IV. April, 1820.—The veins of the arm. v. *Haller*, note 1. — The vena azygos, *de Haen*, Ratio Medendi, Vol. IV. Part X. cap. 1, § 3, p. 391, (in cholic.)—The internal iliac vein in a pregnant woman. v. *W. Blizard*, in London medic. Repository, Vol. I. p. 456.—The veins of the lower extremities. v. *Haller*, note p—s. — The vena portæ. v. *Schenck* Observat. L. III. Part II. No. 51.—Rupture of the veins has also been seen in cold and inflammatory fever. v. *Portal*, p. 355. [*Andral*, Vol. II. p. 399, rupture of the abdominal cava of an apparently healthy man, in a scuffle, and death in a few seconds. T.]

(3) *Else*, Of tumours formed by ruptured veins, sometimes mistaken for aneurysms, in Lond. medic. Observat. and Inquiries, Vol. III. p. 169.

(4) *Panarolus* Iatrolog. Pentecost. I. Obs. 7.—*Pont*, communicated by *A. Cooper*, in Lond. med. chir. Transact. Vol. XII. Part I. 1822. — *Lerche* in Petersb. vermischten Abhandlungen a. d. Gebiete der Heilk. 1823, 2te Samml. p. 208.

(5) Compare *Portal*. — Some such cases of the superior cava I have known, from the accounts of morbid examinations.—Rupture of the inferior cava, from being run over, was seen by *Starke*, in *Rust's* Magaz. f. d. ges Heilk. Vol. V. Part II. p. 323. — One right pulmonary artery, from being run over, without fracture of bones. v. *Rust*, Vol. XX. p. 188.—The vena portæ, together with the aorta. v. *Pyl* Aufsätze und Beob. aus der gerichtl. Arzneiwiss, Vol. IV. case 7, and 8. — Many effusions have been observed from rupture of veins.—I once saw a large bloody tumour arise on the calf of the leg, from rupture of a vein in consequence of a false step.—*Hodgson*, p. 520, on the same part, in two cases, from violent cramp.

(6) *Autenrieth* De vulneratarum venarum sanatione. Tubingen, 1812.—*Ristelhuber* Mémoires sur les plaies et les ligatures des Veines in Annales de la Soc. Méd. prat. de Montpellier, Vol. XLIII. p. 416; and in *Leroux* Journ. de Médec. Vol. XXXIX. p. 3, May, 1817.

§ 207.

Among the VICES OF TEXTURE occurring in the veins, INFLAMMATION, *phlebitis*,[1] and its consequences are the most

important; this is by no means a rare disease, it arises not merely from accidental and intentional mechanical injury, as contusions, stabs, bleeding,[2] amputation, ligature, continued pressure, &c.; but also from internal causes, for instance, gangrene, erysipelas,[3] cold, various fevers,[4] especially the puerperal, scurvy,[5] and particularly also in consequence of irritation propagated from malignant ulcers in the bones and soft parts; inflammation of the veins occurs in the veins of the pelvis and belly,[6] more frequently than in those of the chest, the neck, and head.[7] Inflamed veins appear, according to the variation of the degree of inflammation, more or less red, throughout or in spots, the larger especially on the outer surface of their internal coat, and sometimes also in the cellular tissue, as it were injected, usually also somewhat loosened, opake, shrivelled, and thickened, so that, now and then, when cut through, they exhibit, like the arteries, an orifice which does not collapse; in this their coats are more easily torn than in the healthy state. The most common termination of venous inflammation, is the EFFUSION OF COAGULABLE LYMPH on their inner surface, in the shape of more or less tough and adhering bands, false membranes and plugs, whereby the veins are in a greater or less degree filled, and often completely stopped up.[8] Not unfrequently complete OBLITERATION, *obliteratio*, of the veins is produced by this adhesive inflammation;[9] less frequent is the inflammatory effusion on the external surface of veins, whereby they are sometimes closely consolidated with the neighbouring arteries, nerves, and other parts. Inflammation in veins runs on not unfrequently to SUPPURATION,[10] in which we see either mere pus of various composition, colour, and consistence, secreted into the canal of the vein, from the loosened and, as it were, villous internal coat, or the walls of the vein are actually broken up, perforated, and even entirely destroyed. Inflamed varices also often produce malignant ulcers. The highest degree of venous inflammation not unfrequently runs into MORTIFICATION, which is rather communicated by the neighbouring parts to the veins, although in mortified limbs, they as well as the arteries are often found tolerably healthy; hemorrhage does not then easily arise, as the preceding inflammation has already stopped up and closed the veins; and merely the large veins are opened in particular cases by the sloughing destruction of the neighbouring parts at one part, and thus fatal hemorrhage ensues. Lastly, there also probably occurs an inflammatory state which gives rise to the very rare conversion of the venous coats into CARTILAGE, or BONE, or to the DEPOSITION OF LIME[11] in them.

(1) Although well known to the older writers, it was only first circumstantially treated of by the following authors: *John Hunter*, in Transactions of a Society for the Improvement of medical and chirurgical Knowledge, Vol. I. p. 18.—*P. Frank* De cur. hom. morb. Lib. V. 2. p. 66. — *Abernethy*, Surgical and Physiological Essays.—*Sasse* D. de vasor. sanguiferor. inflammatione. Halæ, 1797.—*Osiander*, Neue Denkwürdigkeiten, Vol. I. p. 57. Goth. 1799.—*Longuet* D. sur l'inflammation des veines. 4to. Paris, 1815.—*Carmichael*, Observations on Varix and venous inflammations.—*Palletta* De inflammatione venarum in Exercit. pathol. I. p. 20;—*Dumbred* D. de inflammatione venar. Edinb. 1822.—*B. Travers* in his and *A. Cooper's* Essays.—*Bunny* D. de inflammatione venar. Edinb. 1823.—*Stan. Czarnowski* D. inaug. chir. pract. de Phlebitide. 8vo. Vilna, 1823, (with four of his own cases).—*Breschet* in Journ. compl. du Dic. des. Sc. médical. Vol. II. p. 325.—*Schwilgué* Faits pour servir à l'histoire des inflammations des veines in Biblioth. médic. Vol. XVI. p. 194.—*Bouillaud* in Revue médicale franç. et étrangère, 1825, Vol. II. p. 71—92 and 418—434.—*Ribes* Mémoire sur la phlebite, *ib.* 1825, Vol. III. Part IV. and VI. — *Ferd. Guttmann* D. de Phlebitide s. inflammatione venarum. 8vo. Berol. 1826.—*H. G. Mende* D. med. chir., nonnulla de venar. inflammatione, præsertim phlebotomiam excipiente, 8vo. Dorpat. 1826, (a fatal case after bleeding.)—*Gendrin* Considérations sur les causes de la phlebite et observations sur l'inflammation des veines encéphaliques in Revue médic. 1826, April and May.—*F. A. Balling* Zur Venenentzündung. 8vo. Würzb. 1829.—Interesting observations are related by *P. Dionis* Cours d'opérations de chirurgie, p. 680, (after bleeding.)—*Morgagni*, Epist. LVI. 10.—*van Swieten* Comment. in *H. Boerhaavii* Aphorism. II. § 372, p. 628, ff.—*Sherwen* in Edinb. medic. commentaries, Vol. IV. p. 206, (after bleeding.)—*Herissé* in Journ. de méd. chir. et pharm. Vol. XII. p. 417.—*Testa* Della malattie del cuore, &c. (on the vena cava and azygos.)—*Dav. Dundas* in Med. chir. Trans. (the vena cava.)—*J. Russel* in Edinb. med. and surg. Journ. Jan. 1814, (the vena cava.)—*Sprengel* in *Rust's* Magazin f. d. ges. Heik. Vol. VII. p. 475, (after wound of the thumb.)—*Erdmann* Annales scholæ clinicæ medicæ Dorpatensis. Annor. 1818-20, (after bleeding and after amputation.)—*Oldknow* in Edinb. med. and surg. Journ. Vol. X. p. 175, (from ligature.)—*Hopfengärtner* in *Hufeland's* Journ. d. prakt. Heilk. Oct. 1820.—*Meli* in Annali univers. di medic. comp. dal *Omodei.* Vol. XVII. and XVIII. Jan.—June, 1821, (general.) — *Fallot* in Journ. compl. du Dict. des Scien. med. Vol. XXXVII. July, 1821, (general inflammation of the vessels.)—*Andr. Duncan* in Transact. of the med. chir. Soc. of Edinb. Vol. I. 1824, p. 439—454, and 470—642.—*Velpeau* in Archives générales de médecine, Oct. 1824.—*Forbes* in Medic. chir. transact. Vol. VIII. p. 293, (the iliac and femoral veins.)—*Guthrie* in London med. and phys. journ, July, 1826, (after amputation.)—*Cruveilhier* in Nouv. Bibliotheque, May, 1826, (of the lower extremities.)—*Monod* in Journ. univers. des Scien. med. June, 1828, (fatal after bleeding.)—*Chapmann* in Philadelphia Journal, No. 14, p. 322, (fatal after bleeding.)—*Hinterberger* in med. chir. Zeitung, 1828, p. 31, (of the inferior cava.)—*Fricke* Annalen des Hamburger krankenhauses, 1828, with plates. [*J. M. Arnott*, On the secondary effects of inflammation of the veins, in Med. chir. Trans. Vol. XV. Part I. p. 1. — *R. Lee* no Phlegmasia Dolens, *ib.* p. 132.—*Ibid.* On inflammation of the veins of the uterus, Vol. XV. Part II. p. 369. Three excellent papers, containing an immense number of original and selected cases. Of late, the French have named inflammation of veins Phlebectasie. v. *Briquet* Essai sur la phlebectasie. T.]

(2) I have twice seen, after blood-letting, fatal inflammation of the veins of the arm, extending up to the superior vena cava; this is also not unfrequently the case in the neck of the horse; in which there is formed, at the part where the vein has been opened, a hard, roundish swelling, sometimes secreting lymph, from which a painful, hard cord may be felt, taking the course of the vein downwards. [*Arnott*, in Medico-chirurgical Transactions, Vol. XV. Part I., mentions several cases of inflamed veins after bleeding; among which, obliteration of the basilic and median basilic, p. 16; of the cephalic, p. 23; of the median basilic, p. 27. He also saw enormous thickening, with increased vascu-

larity in the jugular vein of a horse, p. 48; and mentions another instance seen by Sims, p. 129. T.]

(3) According to *Ribes*, the erysipelas is especially seated in the extremities of the veins, which, however, is difficult to determine.

(4) *Bouillaud* goes so far as to consider typhus and putrid fever as inflammation of the veins, which is certainly incorrect; for I have examined during war time a hundred cases which have died of typhus, and very seldom seen more than a slight inflammatory state of the veins. *Bouillaud* incorrectly esteems as inflammatory, the red colouring of the veins which occurs in typhus and putrid fevers, both in men and animals, which his countrymen, *Trousseau* and *Rigot*, had previously noticed in Archiv. Gén. de Méd. Oct. 1826 and July, 1827; putrefaction, frost, and air, also operate in reddening the veins of dead bodies.

(5) According to *Ribes*. I think, however, that that was not true inflammation, but merely red colouring, which I have observed in the few scorbutic cases I have seen, even in several patches.

(6) In persons with malignant bony caries, long continued ulcers of the legs, senile erysipelas, &c. I have very often found the crural vein inflamed; whilst I write, I have a few such cases before me. I have also sometimes seen the veins inflamed, in the neighbourhood of scrofulous tumours running into suppuration; in monkeys, which have died of tubercles, and inflammation of the lungs; and in a dog, destroyed by distemper, I have found the pulmonary vein here and there inflamed.—[*Lawrence* saw inflammation and obstruction of the iliac veins in a man who died of cancer of the rectum.—v. *Lee*, On inflammation of the veins of the uterus, Med. chir. Trans. Vol. XV. Part II. p. 431. — Inflammation of the veins of the lower extremity excited by malignant ulceration of the cervix uteri. v. *W. Lawrence* Med. chir. Trans. Vol. XVI. Part I. p. 58.—Inflammation of the cava; both common iliac veins and the whole right femoral vein inflamed, thickened and in parts loaded with adventitious membrane in a case of phthisis. v. *T. H. Holberton*, *ib.* p. 63. T.]

(7) Most seldom, as it appears, in the skull; I have, however, seen two instances in the longitudinal sinus; in the former, after injury of the head and trepanning; in the second, in a large abscess of the brain. Other cases have been given by *Abernethy*, in Edinb. med. and surg. Journal, July, 1818.—*Ribes* in Revue Méd. July, 1825, p. 36; and *Gendrin*, Vol. II. p. 31.

(8) *Meckel* gives good engravings of it, v. Tab. Anat. Path. Fasc. II. tab. 14, fig. 6—8. As inflammation frequently produces obstruction of the veins, so on the contrary does it arise, not unfrequently, from pressure and stoppage of the veins; hence varices often inflame, and it is sometimes difficult to determine which is the cause, which the consequence, if simultaneously with phlegmatia alba dolens, or with long continued, great, partial œdema of a part, the principal vein is impervious, which I have very often found in the legs. *D. Davis*, in Med. Chir. Trans. Vol. XII. Part II. p. 419—458, with engravings; and in London Med. Repos. new series, by *Copland*, *Darwall*, and *Conolly*, June and July, 1825, considers the obstruction of the veins of the pelvis, as the cause of phlegmasia alba dolens, in pregnant women; as *Bouillaud* considers it the cause of local dropsy. v. Archiv. Gén. de Méd. July, 1823; May and June, 1824. In rare cases, these coagula in veins become loosened and detached, and give rise to dangerous consequences, especially nervous. v. *Ribes*.—[*R. Lee*, On phlegmasia dolens, Med. chir. Trans. Vol. XV. Part I. p. 132, has shewn by numerous cases, that inflammation of the iliac and femoral veins unquestionably gives rise to that disease. And in Part II. same volume, that the inflammation commences in the uterine branches of the hypogastric, and extends to the iliac and femoral trunks. T.]

(9) Even the v. cava, especially the inferior.—Compare *Rhodius* Mantissa anat. Observ. No. 21, p. 15.—*Th. Bartholinus* Observ. anat. Cent. II. Hist. 35. —*Bontius* de Medic. Indor. Observ. p. 251. — *Albinus* Annot. acad. L. VII. c. 9.—*Haller* in Opuscul. pathol. Obs. 24.—*Winkler* de vasor. lithiasi. I. § 6, note a.—*Baillie* in Transact. of a Soc. for Improv. of med. Knowl. Vol. I. p. 127, pl. 5.—*Wilson*, *ib.* Vol. III. p. 65.—*Vertel* in Quatrième Rapport des travaux de la Soc. d'Agricult. du Doubs, p. 282, (the superior, from pressure of an aneu-

rysmal aorta.)—*Cline* in *Scarpa*, Sull' Aneurysme, p. 15.—*Marjolin* in his Diss. Paris, 1808, (the superior.)—*Knape* in *Hufeland's* Journ. der prakt. Heilk. 1813. Vol. XXXVI. Jan. p. 122.—*Deckart* D. s. descriptionem concretionis venæ cavæ superioris una cum ingente aortæ ascendentis aneurysmate, etc. 4to. Berlin, 1823, with plates. He mentions also, p. 4, a case of obliteration of the inferior cava to be found in the Berlin Mus.—My Selt. Beob. Part I. p. 65, (the superior in an aneurysm.)—The vena anonyma has been seen closed by the pressure of an aneurysm. v. *Pattison* in American medic. Recorder. Philad. 1820, Vol. III. No. 2.—The jugular vein, *Haller* in Pr. de aortæ venæque cavæ gravioribus quibusdam morbis observ. Gött. 1749, p. 6; and in Opusc. pathol. Obs. 23, tab. 19.—*Simpson* in Edinburgh medical Essays, Vol. V. p. 337.—*G. Young*, v. *Hodgson*, p. 533.—*Lardner* in the Edinburgh med. and surg. Journ. 1811, Vol. VII. Part XXVII. p. 407 (from considerable thickening of the pharynx.) I have found the left deep jugular vein closed from the pressure of a large glandular swelling which surrounded it; and the external vein consequently very much enlarged.—The sinus falciformis has been seen closed from pressure of a fungus of the dura-mater three fingers broad.—*Palletta* Exercit. Pathol. Vol. I. p. 94.—The sinus transversus. v. *Abercrombie*.—The iliac vein found obliterated, by *Morgagni*, Epist. LVI. 10; twice by *Hodgson*, p. 530; myself once in a large tumour of the ovarium.—*Forbes* in Medic. chir. Trans. Lond. 1827, Vol. XIII. Part II.—I have found the femoral vein adherent five times; once in a large femoral rupture, once in a scrofulous swelling of the lymphatic glands, and three times in malignant ulceration and œdema of the leg. The smaller veins are not unfrequently found impervious.—[In phlegmasia dolens, the common iliac vein with its subdivisions and the upper part of the femoral resembled a ligamentous cord, and not distinguishable from the surrounding cellular substance. v. *R. Lee* in Med. chir. Trans. Vol. XV. Part I. p. 136.—Also in the same volume, the following are some of the cases mentioned by *Arnott:* Obliteration in basilic and median basilic, after bleeding, p. 16; cephalic obliterated after bleeding, p. 23; median basilic obliterated after bleeding, p. 27.—Obliteration of the left iliac vein, by pressure of an encephaloid tumour surrounding it, is mentioned by *Reynaud* in Journ. hebdom. de Médec. Vol. II. p. 84; and at p. 110 he gives a case of obliteration of the superior vena cava from pressure of an aneurysm. T.]

(10) Superficial suppuration on the internal surface of the veins is not rare; sometimes, the vein being closed to a greater distance above and below, by adhesive inflammation, a kind of abscess, or long hollow swelling, is produced; in other cases the enlarged veins burst by ulceration, and fatal hemorrhage ensues. v. *Portal* Cours d'Anatom. Med. Vol. III. p. 354, (the superior cava near the auricle.)—*Cerutti* Beschreib. der pathol. Präpar. zu Leipz. No. 746, (two lenticular apertures in the inferior cava.) I have once observed fatal effusion of blood into the intestine from ruptured vena portæ. v. My Verzeichn. No. 2559.—Rupture of the splenic vein, with fatal effusion of blood into the stomach, has been observed several times; I saw one instance of it in the Hunterian Museum in London, and another in *Sandifort's*, at Leyden.—Fatal rupture of the gastro-epiploic vein has been noticed by *Ware* in New England Journ. of Med. and Surg. new series, Vol. IV. July, 1820.—One case of rupture of the gluteal vein, in psoas abscess. v. *Rust's* Magaz. f. d. ges. Heilk. Vol. I. p. 48.

(11) *Bichat*, in his Anat. generale et pathologique, improperly denies the occurrence of ossification in the veins. Instances of it are related by *Morgagni*. Epist. LXIV. g.—*Ruysch* Thes. anat. VIII. No. 58.—*Salzmann* D. de ossificat. præternat. p. 27. Argentor. 1720.—Ephem. N. C. Dec. II. Ann. X. Obs. 175, (on the coronary vein of the heart).—*Murray* in Act. med. Suec. Upsal. 1783, Vol. I. p. 3.—*Walter* Observ. anatom. p. 45. tab. 9.—*Meckel* v. *Sasse* D. de vasor. sanguifer. inflammatione, p. 38, Halæ, 1797, (a diseased vein creaked in cutting.)—*Baillie*, Transact. of a Soc. for Improv. of med. Knowledge. Vol. I. p. 134.—*Lobstein*, v. Mém. de la Soc. des Sc. Agricult. et Arts de Strasb. Vol. I. p. 344, note; and Compte rendu sur son Museum anatomique, Strasb. 1820, p. 115. No. 452 (the vena portæ.)—*Cruveilhier* Essai sur l'Anat. pathol. Vol. II. p. 70.—*Hip. Clocquet* in Dict. des Sc. médical. Vol. XXIV. p. 295 (the brachial vein.)—*Cerutti* No. 855 and 856.—*Landgran* in Ars Berättelse om Svenska Läkare-

Sällskapets Arbeten, 1827, p. 31.—I have never myself seen ossification of the veins; but I saw, in the Anat. path. Mus. at Vienna, a splenic vein, No. 547, a vena portæ, No. 2484, the brachial and femoral veins of an old man and woman, and also, in the Veterinary School at Munich, the preputeal veins of a horse ossified.

§ 208.

SPURIOUS FORMATIONS of several kinds also occur occasionally in the veins. To these belong, the rare observation of ENCYSTED TUMOURS,[1] FATTY SWELLINGS,[2] and HYDATIDS,[3] upon and in them; the equally uncommon depositions of TUBERCULAR MASSES on their coats in affections of the neighbouring lymphatic glands,[4] and lastly, SARCOMATOUS TUMOURS,[5] which either originate primarily in them, or extending from the neighbouring parts, perforate the walls of the larger veins and enter into their cavities.

(1) For instance, in the venæ cavæ. v. Bresl. Samml. Suppl. II. p. 168.

(2) Under the internal coat of the vena portæ in a man, who had been affected with jaundice and cancer of the stomach. v. *Honoré* in Rev. Médic. franç. et étrang. 1823.

(3) The case of *Peyer's*, in Misc. Acad. N. C. Dec. II. note 7, 1688, p. 385, who found a flat hydatid in the vena portæ of a pig, appears rather to be a distoma hepaticum.—*Andral*, the younger, found in a man, who had many hydatids in the lungs, also several large hydatids in the pulmonary veins. v. Bulletin des Sc. par. la Soc. philom. 1823, p. 15.—*Magendie's* Journ. de Physiologie, Vol. III. No. 1. p. 69; and in *Andral's* Clinique médicale, Vol. III.

(4) I have observed this several times in such way, that the scrofulous matter had penetrated the coats of the vein and filled up its cavity. In other parts scrofulous ulceration had more or less destroyed the arteries and veins.

(5) In a man who had scirrhus of the stomach, a mass larger than a hazel-nut was found in the expanded splenic vein. v. *Hodgson*, p. 524.—A sarcomatous swelling in a girl of nine years old, was attached by a neck to the superior cava, and filled it up. v. *Wolf* in *Rust's* Magaz. f. d. ges. Heilk. Vol. XIV. p. 570.—In a person who died of vomiting of blood, a yellow pulpy swelling on the lesser curvature of the stomach, and a similar one in the vena portæ, by which it was filled. v. *Ward* in the London Med. Reposit. Vol. XX. Oct. 1823.—Medullary sarcom penetrated in two cases into the vena cava. v. *Velpeau* in Revue Méd. franç et étrang. 1825, Vol. I. p. 217—240, and 343—360.—In the Anat. pathol. Mus. at Vienna, I saw a large polypous-like growth, with a neck in the vena cava, behind a similarly diseased liver, No. 2513; and a medullary sarcom of the inferior cava, No. 3906; and a sarcomatous tumour in the superior cava, No. 4110:—lastly, I found a sarcomatous growth, of the size of a hazel-nut, in the vena cava, near the liver, in a stag, which I had kept for several years. v. No. 8747 of Bresl. Mus.—A branch of the vena cava had a cancerous-like appearance. v. *Churchill* in London med. and phys. Journ. March, 1827.

§ 209.

Lastly, we often observe some irregularities in the veins with reference to their CONTENTS. Thus, as after death the BLOOD[1] is especially found only in the veins, so any remarkable peculiarities in it deserve to be first mentioned. It sometimes varies as well in QUANTITY as in QUALITY; the former shews itself partly, in the great DEFICIENCY OF THE BLOOD, *anæmia*, which we sometimes observe as a congenital vice

in imperfect monsters, and is occasionally to such extent, that we are reminded of the similar state in the early stage of fœtal existence and in the lower animals;[2] sometimes it is found as an acquired state, in many cachectic persons, in many fevers, in severe hemorrhages, in death from hunger:[3] partly, in the TOO GREAT QUANTITY OF BLOOD, *polycæmia*, *plethora*, which is occasionally observed in somes corpses, viz. in persons affected with the blue disease, in hydrophobic persons, and brutes.[4] Anomalous colour, consistence, and composition, are vices of QUALITY in the blood, which not unfrequently occur; thus we often find it, for instance, too thin and pale after severe loss of blood, in leucophlegmatic dropsy, tubercular disease, diabetes,[5] &c.; in a person who was destroyed by the poison of prussic acid contained in nut-water, the blood had a remarkably light-blue colour;[6] in inflammation and consumption, it is very highly red-coloured, and, on account of the great quantity of coagulable lymph it contains, often firmly coagulated in the vessels; we find the blood very deep-coloured, actually black and very fluid, in the veins of persons affected with the blue disease, scurvy, jaundice,[7] hydrophobia, yellow fever, the fever of mortified spleen, and carbuncle, in drowning or suspended respiration from other causes, so also in actual suffocation, and in men and animals destroyed by poisons; in *melanosis*, we find black flakes and even large clots of black pigment in the blood;[8] occasionally the blood is black and viscous, as though it were clayey, which has been observed sometimes in yellow fever,[9] mortification of the spleen, &c. In poisoning from sulphuric acid, the blood in some cases is completely coagulated in the vessels.[10] The morbid composition of the blood and the mixture of foreign substances in it, frequently may be observed without any chemical analysis.[11] Thus, for instance, is the quantity of fibrous matter contained in the blood of many corpses remarkably great or small; in others, we find the chyle not intimately mixed with the blood,[12] or yellowish flakes of albumen in the black uncoagulated blood,[13] or an unusually large and very readily discernible quantity of fat,[14] especially in brandy-drinkers,[15] &c. Sometimes we find, without its being the consequence of putrefaction, a greater or less quantity of AIR in the veins, either like bladders mixed with blood, or alone, which distend them more or less completely;[16] in many instances the air passes distinctly from without by apertures in the veins.[17] PUS has been found several times in the veins, not produced by ulceration of their surface, but by effusion from neighbouring abscesses, and by absorption into the veins.[18] PARASITIC ANIMALS are also met with in the

veins.[19] We very frequently observe VEIN-STONES, *phlebolithi*,[20] that is, chalky concretions, deposited in the cavities of the veins, which occur especially in the veins of the urinary and generative organs, although sometimes also found in other parts, and are either little rounded stones composed of concentric layers of lime, situated loosely on the wider parts of the veins, or close calcareous cylinders entirely filling the veins to a greater or less extent.[21] In a few instances, NEEDLES have been found in a vein.[22]

(1) *Besler* D. de sanguinis contributione secundum et præternaturam. Altd. 1631.—*Steuerlin* D. de morbis ex crasi sanguinis alterata oriundis. Altd. 1682.—*Albinus* D. de pravitate sanguinis. Fr. 1689.—*de Sandris* De naturali et præternaturali sanguinis statu. 4to. Bonon. 1696.—*Reichhelm* D. de legitima particularum sanguinis earumque perturbata mixtura. L. B. 1702.—*Rivinus* and *Bornholt* D. de sanguinis pravitate. Ultraj. 1702.—*Brunner* D. de mala sanguinis temperie. Groning. 1707.—*Otto* D. de sanguinis humani constitutione naturali et præternaturali, 1735. — *W. Hewson* Experiments on the Blood, with some remarks on its morbid appearances, in Phil. Trans. 1770, p. 368.—*Gruner* D. Pathol. sanguinis. Jenæ, 1791. — *J. Whiting* D. de sanguine ægrorum. Edinb. 1816. — *van der Kolk* Historia sanguinis coagulantis, cum experimentis ad eam illustrandam institutis. 8vo. Groening, 1821.—*J. Davy*, Some observations on the buffy coat of the Blood, &c. in Phil. Transact. 1822, p. 271.—*W. Stoker* Pathol. Obs. Part I. On Dropsy, Purpura and the Influenza of the latter year, and particularly on the morbid changes of the blood, &c. 8vo. Dublin, 1823. — *Ch. Scudamore*, An Essay on the Blood, comprehending the chief circumstances which influence its coagulation, the nature of the buffy coat, with a concise medical view of the state of the blood in diseases, &c. 8vo. London, 1824.—*Koenig* D. s. experimenta quædam circa sanguinis inflammatorii et sani qualitatem diversam instituta. 4to. Bonnæ, 1824.—*Spitta* De sanguinis dignitate in pathologia restituenda, etc. 8vo. Rostoch. 1825.—*Koch* D. de observationibus nonnullis microscopicis sanguinis cursum et inflammationem spectantibus, etc. Berol. 1825.—*Belhome* Beobachtungen über das Blut und die crusta inflammatoria, u. s. w. in the Revue médicale in *v. Froriep's* Notizen, Vol. VII. p. 247. — *Heusinger* 1ter Bericht von der anthropotom. Anstalt. p. 7. 4to. Wurzburg, 1826. — *Leuret* Essai Sur l'altération du sang. Thèse médicale. 4to. Paris, 1826.—*Trousseau* and *Dupuy* Experiences sur les altérations du sang, considérés comme causes des maladies locales in Archiv. général de Médec. June—August, 1826. — *Velpeau* Recherches et Observations sur l'altération du sang dans les maladies in Revue médicale et Journal de Clinique. June, 1826.—*M. Junkelmann* D. de cacochymicis sanguinis indeque oriundis ægritudinibus. 4to. Jenæ, 1827.—*J. R. Burkhart* Ueber das Blut und das Athmen in physiol. und allgem. pathol. Hinsicht. 8vo. Basel, 1828.—*Ribes* in l'Anatomie pathol. Vol. I. p. 309. Paris, 1828.

(2) For instance, in the acephala; compare *Meckel's* Handb. der pathol. Anatomie, Vol. I. p. 170. — I have, however, observed a similar paucity of blood in other human and animal monsters, characterized by deficient development.

(3) I have seen many bodies which seemed almost bloodless, so that, with difficulty, we could only find any in the large venous branches; or, on the contrary, very little in the smaller blood-vessels.

(4) We find bodies, in which the quantity of blood is very remarkable, so that not merely is the heart and larger vessels, but also all the smaller, gorged with blood, and on the slightest incision the blood pours out.—*Krugenberg* observed also this in a person who died of hydrophobia, who had been very freely bled. v. *Horn's* Archiv f. medic. Erfahrung, 1817, March and April, p. 356.

(5) Also very pale in animals; for instance, in an ass which died of

putrefaction. [*Andral*, Vol. II. p. 413, states that he has several times seen the blood remarkably frothy in some of the veins, or in the cavities of the heart, without there being any trace of putrefaction in the body; and seems inclined to think it takes place before death, but speaks of it with great caution. T.]

(17) After violent blood-letting.—In the blood-vessels of a person whose head was cut off. v. *Testa*, in operations on the neck, in which the jugular vein being injured, the air rushed, with a hissing noise, into the vein. v. *Magendie* in Journ. de Physiol. 1821, Vol. I. No. 2. p. 190. — *Dupuytren* in Archives générales de Médecine, July, 1824, p. 430; also v. above, § 184, note 3.

(18) Viz. in the inferior cava in abscess of the liver. v. *Blancardi* Observat. Cent. II. No. 73. — *Ribes*. v. Mém. de la Soc. med. d'emulation, Vol. VIII. Part II. p. 613.—*Velpeau* in Archives générales de Médec. 1824, Vol. VI. p. 227. —*Gendrin* Hist. Anat. des inflamm. I have also sometimes found pus in the femoral vein, in ulcers of the leg, without the vein being diseased.

(19) Viz. the strongylus inflexus in the pulmonary veins of a porpoise. v. *W. Vrolik* in Bydragen tot de natuurkundige wetenschappen versameld door *van Hall, W. Vrolik* en *Mulder*, D. I. No. 1. p. 77, Amsterd. 1826.—Two strongyli in the vena azygos of a porpoise. v. *von Baer* in Nov. Actis Acad. N. C. Vol. XIII. P. II. p. 560, Nat.—*F. J. Schmitz* D. de vermibus in circulatione viventibus. 8vo. Berol. 1826, with lithographic tables. The polystoma venarum, which *Treutler*, Obs. pathol. anat. p. 23, tab. 4, fig. 1—3, found in a vein of the foot of a man, was, as *Rudolphi* has remarked, probably a planaria, which had made its way in.

(20) *Realdus Columbus* De re anatomica, Lib. XV. p. 491, 8vo. Francof. 1593, (in the hemorrhoidal veins.)—*Schenkii* Observat. med. rar. L. III. § 2, Obs. 54, Francof. 1600. — *Thom. Bartholinus* Histor. anatom. rarior. Cent. III. Hist. 34, Vol. II. p. 71, with figs. (in the renal veins.) — *Greisel* Lapilli cum sanguine e vena prosilientes in Misc. Acad. Nat. Cur. Dec. I. Ann. I. 1670, p. 163; Ann. II. 1671, p. 23. — *Roesler* De calculis in venis mesaraicis, *ibid.* Dec. I. Ann. III. 1671, p. 528. — *Tulpius* Observat. med. L. IV. cap. 22. 4th edit. 8vo. 1672, (in a dorsal vein.)— *J. G. Walter* Observat. anat. p. 44 and 45. fol. Berol. 1775, (in the veins of the bladder five, and in those of the vagina three, as large as peas.)—*Sömmerring* Addend. to *Baillie*, No. 5, p. 191, (on the urinary bladder.)—*Langstaff* in *Hodgson*, p. 522, (three as large as peas on the veins of the uterus.)—*Cruveilhier* Essai sur l'Anat. pathol. Vol. II. p. 70, (two instances in the veins of the bladder; he also cites cases from *Lobstein* and *Laennec*, on the rectum, bladder, pubic and spermatic veins; as also from *Dupuytren*, on the pubic veins, and *Tilorier*, on the cutaneous veins of the thigh.)—*J. F. Meckel* Handb. der pathol. Anatomie, Vol. II. Part I. p. 190; and Tab. anat. pathol. Fasc. II. p. 13, pl. 14, fig. 4, 5, (once on the veins of the bladder.) — *F. Tiedemann* in *Meckel's* Archiv für die Physiologie, Vol. IV. p. 215, with plates.—*Rosenthal* in *Horn's* Archiv. f. medic. Erfahrung, May and June, 1818, p. 404.—*Cerutti* Beschreibung der pathol. Präparate zu Leipzig, No. 600 and 601, (from the plexus uterinus and vesicalis.) — Myself on venous stones, in my Selt. Beob. Part II. p. 72, No. 32; and my Verzeichniss, No. 4284, 4285. I have since also found them in the veins of the spermatic cord.—*Bouillaud* in Revue médicale française et étrangère, April, 1825, (sometimes in old varices of the lower extremities.)—*Ehrmann* Compte rendu des travaux anatomiques, &c. Strasb. 1827, p. 38, (thirty-two in the veins of the prostate gland.) — I have found venous stones in almost all the large anatomical collections; the largest, however, which I have seen was the size of a hazel-nut, and from the splenic vein, in the Anat. Mus. at Strasburgh.—*John* has given an analysis of them in *Schweigger's* Journ. f. Chemie und Physik, Vol. XII. p. 80, and *Gmelin* in *Tiedemann*, according to which, they consist principally of phosphate and carbonate of lime.

(21) Compare my Selt. Beob. and Verzeichn. No. 4286 and 4287. I also saw the veins of the large intestines of a horse affected with glanders, and disease of the bones in the veterinary school at Stockholm; perhaps also the case of *Walter's*, Observ. Anat. p. 45, tab. 9, above mentioned, in which the crural vein was filled with a large piece of lime. As to the origin of these phlebolithi, I cannot agree with *Hodgson's* opinion, that they pass from without, by a rapid absorption

of the veins, nor *Meckel's* view, that they are produced like encysted tumours; but rather adhere to the opinion of *Tiedemann*, that they are produced from and in the blood itself, for the reasons which I think I have made clear; this point is also supported by the rare observation of *Ehrmann*, according to which, some of the phlebolithi were still soft, and appeared to be formed from the fibrous matter of the blood; a mode of formation which *Cruveilhier* had previously noticed.

(22) In one branch of the brachial vein. v. *Duverney* in Mém. de Paris, 1702, Hist. p. 25; in a vein, *Plot*, Natural history of Staffordshire, &c. v. *Plouquet* Repertor. Art. Vena.

FIFTH CHAPTER.

Of the Lymphatic Vessels and Glands.

§ 210.

As to the vices of formation and disorganization of the absorbing system,[1] there is, on account of the delicacy of its structure, but little certainly known, and even this especially applies to the thoracic duct and the lymphatic glands, which latter, as coils or congeries of the absorbents, must be here considered together with them. As, however, the lymphatic system is so generally distributed in the bodies of men and the higher animals, and performs a principal part in the business of the change of substance in the organism, it is easy to see that in most general and local diseases it must be affected, partly idiopathically, partly deuteropathically; this is particularly observable in rickets, in tubercular disease in its widest sense, in syphilis, cancer, and plague. Organic vices of the absorbent system occur most frequently also in youth, when the vital activity is at the highest, but most rarely in old age, when the vegetative process gradually declines.

(1) *Lossius* D. de glandularum passionibus in genere. Witeb. 1682.—*Fr. Schrader* Lympha et glandulæ pathologice consideratæ. 4to. Helmst. 1686.—*J. Walker* D. de glandularum morbis. Edinburgh, 1743.—*Russel* Œconomia naturæ in morbis acutis et chronicis glandularum. London, 1755.—*Diedrich* de morbis glandularum. Lips. 1759.—*Edm. Darwin*, Experiments establishing a criterion between mucilaginous and purulent matter; and an account of the absorbent vessels of animal bodies in some diseases. 8vo. London, 1780.—*J. C. Szombathy* De morbis glandularum secundum ætates. Vien. 1782.—*Assalini* Essai médical sur les vaisseaux lymphatiques, avec le moyen de prévenir les effets venimeux des substances venimeuses. 8vo. Turin, 1787.—*L. Formey* D. de Systematis absorbentis pathologia. 8vo. Hal. 1788.—*Wrisberg* in Comment. Soc. Goetting, Vol. IX. Part I. p. 136.—*Ludwig* D. Physiologorum atque pathologorum de systemate absorbente recentissima quædam decreta. Lips. 1789.—*Pajol* De Morbis vasor. absorbentium in Mém. de la Soc. de Médec. de Paris, 1791, Vol. VII. and VIII.—*D'Hame* Idea pathologiæ systematis absorbentis. 8vo. Coloniæ, 1792.—*De Koning* D. de affectionibus morbosis systematis

lymphatici. Lugd. Batav. 1793.—*S. Th. Sömmerring* De morbis vasor. absorbentium corporis humani. Traj. ad Moen. 1795.—*Gilibert* Essai sur le systême lymphatique dans l'état de santé et de maladie. Paris, 1804.—*Alard* Histoire d'une maladie particuliere au systême lymphatique frequente, etc. 8vo. Paris, 1808, with plates. — *Attenhofer* Lymphatologie, oder Abhandlungen uber das lymphat. system und dessen Leiden. Wien, 1808.—*W. Goodlad*, A practical essay on the diseases of the vessels and glands of the absorbent system. 8vo. London, 1814.—*Andral*, fils, Observations sur les maladies du canal thoracique in Archives générales de médecine. Dec. 1824.—*Reg. Lippi* Illustrazioni fisiologiche e patologiche del sistema limfatico-chilifero, mediante la scoperta di un gran numero di communicazioni di esso col venoso. 4to. Firenze, 1825.—Compare besides the anatomico-physiological writers on the absorbents, and the greater number of the works on scrofula, quoted at § 65, note 1.

§ 211.

As to the VARIETIES in this system, they are just as frequent as in the venous, so that the comparison of the large absorbent trunks in different individuals, on the right and left side, often presents great variation in reference to their number and course. We most frequently observe such variations in the *ductus thoracicus*;[1] thus, for instance, it commences higher or lower in the belly, and also consists of more or less branches, divides at one or more points of its extended course into two or three branches, is double throughout its whole length,[2] divided merely at the upper part,[3] or empties itself at unusual points,[4] &c. Sometimes the larger absorbing vessels from the neck and arms terminate singly in the subclavian veins, so that then there is no common absorbing trunk on the right side. We observe it arched, not merely in distortion of the back, but also as consequent on its elongation in the normal state of the spine; sometimes very tortuous, or disturbed from its usual situation by tumours on the front of the vertebræ, by the *vena cava* taking an irregular course,[5] &c. The number and situation of the absorbing glands sometimes varies; thus we find on the leg, as well as on the fore-arm, one or several unusual glands, or in many places, for instance in the groin and arm-pit, instead of many small, fewer but much larger glands.

(1) *Haller* Elem. Physiol. Vol. VII. p. 222, § 11. — *Sabatier* in Mémoires de Paris, 1780.—*Janus Bang* De variationibus in ductu thoracico visis in Soc. med. Havn. Collectaneis, Vol. I. p. 82. — *Sömmerring* Vom Baue des menschlichen Körpers. 2d edit. Part IV. p. 583.

(2) It then usually empties itself into the right subclavian vein, but not always, and receives all the absorbents, which usually terminate in the lesser principal thoracic trunk.—Such cases were seen by *A. F. Walther* De ductu thoracico bipartito, etc. 4to. Lips. 1731, rec. in *Halleri* Disp. anat. Vol. I. — *le Noble, Collins, Duvernoy, Winslow, Wium.* v. *Haller*, who saw it twice; further *Th. Bartholinus* Anat. L. B. 1686, p. 620.—*W. Cruikshank's* Anatomy of the absorbing Vessels.—*Sömmerring*, p. 583, note 2.—I have twice found it completely double, and indeed in one instance both terminated on the left side in the jugular and subclavian vein; in the other on each side in the subclavian vein.

(3) The thoracic duct not unfrequently terminates on the left side of the neck

by two or three branches; if it be divided further down, the right branch terminates in the right subclavian. Such cases were observed by *Wium*, *Heuermann*, *Velse*, *Pequet*, and *Rolfink*. v. *Haller*, p. 224. I have also seen the same in a wax model in the anatomical collection at Upsal.

(4) Not merely in persons with general transposition of the viscera; but sometimes also in others, it empties itself into the right subclavian vein.—Compare *Haller*, p. 223, note 1.—*Meckel* De vase lymphat. gland. conglob. 4to. Berol. 1757, p. 19.—*Cruikshank*, The Anatomy of the absorbent Vessels of the human Body. 4to. Lond. 1786, 2d edit. 1790, p. 152.—*Fleischmann* Leichenöffnungen, p. 236, No. 75.—It has also been seen terminating entirely, or only by a single branch, in the vena azygos; the former is described by *Albinus*. v. *Cruikshank's* Anatomy of the absorbing Vessels, 4to. London, 1786, and *Mascagni* Vasorum lymphaticorum corporis humani historia et iconographia. fol. Senis, 1787. v. *Ludwig*, Vol. III. p. 42.—Of the latter *J. C. Bohl* D. viæ lacteæ corporis humani historia. Regiomont. 1741.

(5) I have sometimes seen it thrust out of its place by exostoses, and in one case, by the inferior cava passing behind it and the aorta; the latter is engraven by *Gurlt*, D. de venar. difformitatibus. 4to. Vratislaviæ, 1819. Sometimes it is very much displaced by aneurysm of the aorta. v. *Bayford* in Medic. Obs. and Inquir. Vol. III. p. 18.

§ 212.

The SIZE of the absorbent vessels varies in the same way as that of the veins; thus in many individuals they are all very small and narrow,[1] in other instances again they are all proportionally too wide, and more frequently vary from their usual SIZE only at particular parts of the body, inasmuch as, for example, in atrophic parts they are very much straightened, or are compressed at certain parts by adjacent swellings, or lastly, and which occurs more commonly, and is more frequently noticed, they are remarkably expanded at certain parts, either on account of the relaxation of their walls, or of mechanical obstruction to the progress of the lymph, that is, become VARICOSE, a state to which, in the most restricted sense, we apply the name *cirsus*, or ABSORBENT KNOTS.[2] Those HYDATIDS which are connected with delicate and in part hollow threads, and are often in rows, for example, in the vascular plexuses of the cavities of the brain, in hydatid moles, &c., perhaps arise from varicosity of the absorbent vessels.[3] More apparent are the deviations from normal size in the lymphatic glands, which appear equally in two states, viz. diminution or wasting, and still more frequently, in several diseases, as idiopathic or sympathetic, and often very considerable swellings. The too great extension of the lymphatic vessels may also lead to their consequent RUPTURE OR BURSTING,[4] whereby effusions and collections of lymph occur in the cellular tissue, producing the LYMPHATIC TUMOUR, *tumor lymphaticus*,[5] so called; or, if the thoracic duct be torn, effusion of lymph into the mediastinum, *hydrops lacteus*, as it is named.[6] Similar effusions of lymph also occur after WOUNDS[7] of the larger trunks, the cure of which, on

account of this effusion, is sometimes difficult; but when it takes place, it is always alone effected by adhesion and closing of the lymphatic vessels.

(1) For instance in dwarfs. v. *Sömmerring* De morbis vasor. absorb. p. 42.

(2) Many instances of great varicosity of the absorbents are to be found in *Wrisberg*, and *Cruikshank*, and in *Sömmering*, § 22, Vasa absorbentia varicosa.—I have often observed it in the absorbents of the lungs, liver, intestines, pelvis, and of the lower extremities, either on account of compression or stoppage in their more superficial trunks and glands. I have a few times found the thoracic duct compressed by aneurysms of the aorta, or stretched by their lying beneath it; the same has been observed by *Laennec* Journ. de Médec. cont. Vol. XII. p. 159.—The thoracic duct has been once seen as thick as the finger. v. *Cruikshank*, p. 207, pl. 5. 2d edit.—*Baillie*, in his Morbid Anatomy, p. 108, mentions one nearly as large as the subclavian vein, of which *Sömmerring*, in his Addenda to *Baillie*, gives another instance.—According to *Baron* these tubercles arise from enlargement and great development of the lymphatic vessels, or from the formation of little cysts in them. v. Delineations of the Origin and Progress of various changes of structure, &c. 4to. Lond. 1828, with plates.

(3) Of this opinion, for example, is *Bidloo* De hydatidibus in Exercit. anat. chir. L. B. 1708. — *Hufeland* Ueber die Natur, Erkenntnissmittel und Heilart der Skrofelkrankheit. p. 382. Jena, 1795. — *Rudolphi* resp. *Carger* De ventriculis cerebri. Gryphiæ, 1786.—*Lüdersen* D. de hydatidibus. Gött. 1808, p. 82.—This kind of hydatids seems to me, in some cases, rather to be connected with the extremities of the arteries.

(4) It is well known that the older writers erroneously derived consumption especially, and also scrofula, &c. from rupture of the absorbents.

(5) *Plenck* Novum systema tumorum, p. 127. Viennæ, 1767. — *A. Beinl* Von einer eignen Art Lymphgeschwulst, und der zweckmässigsten Methode dieselbe zu heilen. 4to. Wien, 1801.—*J. A. Schmidt* Ueber den Grund der Tödtlichkeit der Lymphgeschwülste, in the Abhandlungen der Josephinischen Akademie, Vol. II. p. 327, Wien, 1801.—*Nyblæus* præs. *Ackermann* D. de tumore lymphatico, Upsalæ, 1807.—*Strunk* D. de abscessu lymphatico, Goett. 1809.—*Rust* Abhandlung von den Lymph. geschwülsten in *Harles's* Jahrb. der deutschen Medicin und Chir. Vol. I. p. 155. Nürnberg, 1814.—*Von Walther* Ueber die wahre Natur der Lymphgeschwülste in his and *Gräfe's* Journal f. Chir. Vol. I. p. 584—611.—*Chelius* in *Textor's* Neuem Chiron. Vol. I. p. 115—125.—*G. Zembsch* D. de tumore lymphatico. 8vo. Berol. 1826.—That *Walther*, and other surgeons of modern times, have very properly shewn the greater number of lymphatic abscesses to be no more than ulcers of a peculiar kind does not, according to my opinion, contradict the existence of lymphatic tumours from the causes here mentioned.

(6) *Bassius* Observationum Decas II. Observat. VII.—*Guiffart* in *Bartholinus* Opera nov. p. 490.

(7) *J. Muys* De vulnere vasculi lymphatici in Praxi medico. chirurg. p. 240, Amstel. 1695.—*Ant. Nuck*, De vulneribus vasor. lymphaticor. in Experimentis chir. L. B. Cap. 28, 1733; comp. *Sömmerring*, p. 52, § XXVII. I have known a few cases of a free flow of lymph from wounds made in opening veins. On injuries of the thoracic duct, see the writers on medical jurisprudence; in one such case, the lymph continued to flow, and produced a fistula. v. *Fr. Hoffmann. B.* affectus rarissimus perpetui stillicidii succi nutritii, in Opusc. supp. II. 2.

§ 213.

VICES OF TEXTURE in the lymphatic system appear to be the same as those in veins; but they are naturally less easily observed. INFLAMMATION,[1] both of the ABSORBENT VESSELS and GLANDS, is frequent; the former sometimes take on that state during life, giving the sensation and appearance of hardish,

painful threads, producing reddish streaks in the skin, and in the dead body they appear, especially if the inflammation were chemical, more or less red, thickened, hardened, knotty, opake, less elastic, and if it be the *ductus thoracicus*[2] even freely covered with a net-work of blood-vessels: the latter exhibit inflammation, especially by great swelling,[3] compactness, and increased redness: commonly also we find the neighbouring cellular tissue inflamed at the same time. This inflammation of the lymphatic system is sometimes idiopathic, and is then very commonly produced in men and animals, partly by local, mechanical, and chemical irritation, partly by general disease of this system, viz. by scrofulous and tubercular disease; in other cases the inflammation of the absorbent and lymphatic glands is sympathetic,[4] metastatic and even critical.[5] This disease rarely runs immediately into SUPPURATION and MORTIFICATION, but it has rather a disposition to INDURATION, internal effusion, and consequent OBSTRUCTION[6] and ADHESION, whence, subsequently, in part suppuration occurs, which indeed is frequently the case in scrofulous swellings produced by induration and stoppage of the branches of the absorbent vessels and lymphatic glands;[7] partly œdematous swelling of those parts from which the reflux of the lymph is prevented; and, lastly, consumption frequently occurs. Continued pressure also easily effects adhesion of the absorbent vessels. The *ductus thoracicus* has also been several times observed obstructed or adherent from coagulated and exuded lymph.[8] Lastly, the inflammatory irritation often gives rise to the conversion of the tissue of the absorbent vessels and glands into a cartilaginous mass, and a deposition of lime in their tissue. The latter is observed but rarely and very partially in the absorbent vessels;[9] on the contrary, in the lymphatic glands, especially in the bronchial and mesenteric glands of men and animals,[10] it occurs frequently and largely, so that oftentimes they are completely converted into a stony mass.

(1) Here belong the endemic swelling of the legs, of Barbados. v. *J. Hendy*, Treatise on the glandular Disease of Barbados, proving it to be seated in the lymphatic system. London, 1784. *J. Rollo*, Remarks on the disease lately described by *Dr. Hendy*, &c. London, 1785.—*Alard* De l'inflammation des Vaisseux absorbens lymphatiques dermoides et souscutanés, maladie designé par les auteurs sous les différens noms d'Elephantiasis des Arabes, d'Œdeme dur, de Maladie charnue, de Maladie glandulaire de Barbade, etc. 8vo. 2d edit. Paris, 1824. *Fr. Fedeli* De lymphangioitide, ejusque formis diversis. 8vo. Patavii, 1825.—*Gendrin* Histoire Anatomique des inflammations, 2 vols. 8vo. Paris, 1826.

(2) Two cases are found in *Andral*, and one in *Gendrin*, p. 70, § 1001.

(3) Panus or Adenophyma.

(4) For instance,—in difficulty of cutting the teeth; in lying-in women, in the first secretion of milk in the breast; in the neighbourhood of many eruptive

diseases of the skin,—malignant ulcers; in syphilis in the unguinal glands; in buboes, &c. Compare *J. D. Prophet* D. de sympathica glandularum inflammatione. 8vo. Halæ, 1823.

(5) In typhus fever, and especially in the plague; although, according to some authors, the plague boil is not seated in the lymphatic glands, but in the neighbouring cellular tissue; compare *P. Russell*, Treatise of the Plague, 4to. London, 1791.—*Larrey* Mém. de Chir. Mil. Paris, 1812. In yellow fever, the plague bubo, bubones pestilentiales, are said to be very rare. *A. Ramsay*, however, found the lymphatic vessels opake, inelastic, widened, and thickened, in a person who had died of yellow fever. v. Edinburgh medic. and surg. Journ. 1812, Vol. VIII. Part IV.

(6) Not every lymphatic gland swollen by inflammation is, as the old writers thought, rendered impervious, but, on the contrary, rendered wider, as quicksilver will pass more easily through them than usual; but in the higher degrees of inflammation, and its consequences, as also in scrofulous, scirrhous, and other hardening, the glands are partially or completely obstructed.

(7) Compare § 65.

(8) *Cruikshank.*—*Mascagni* Vasor. lymphaticor. corporis humani Historia et Ichnographia. fol. Senis, 1787.—*Assalini* Versuch über die Krankheiten des lymphat. Systems, p. 41.—*Walter* in Mém. de l'Acad. de Berlin, 1786, p. 21.—*Poncy* in *Saviard's* Recueil d'Observations chirurgicales. Observat. 3.—*Watson* in Philos. Transact. Vol. L. p. 392.—*Astley Cooper* in Medical Record and Researches from the papers of a private medical association. Vol. I. London, 1798, (three cases, in one ulceration and adhesion of the valves.)—*Goodlad.*—*Hopfengärtner* in *Hufeland's* Journ. d. prakt. Heilk. June, 1817.—*Nasse* Leichenöffnungen. 1te Reihe, p. 150.—*Andral*, third observation.—*Lobstein* Compte rendu sur les travaux anatomiques, etc. Strasb. 1824, p. 67, No. 131.—*Baillie*, the works of, ed. by *Wardrop*, London, 1825, Vol. I.—*Gendrin*, p. 70, § 1001.

(9) To wit, *Mascagni*, p. 30.—*Attenhofer.*

(10) The glands sometimes contain one or several bony concretions; sometimes they are completely converted into stone, with a smooth surface; sometimes they have merely an external bony capsule; sometimes, finally, the lime in a state of pap is contained within the gland as in a kind of sac. Among animals I have found ossification of the glands in monkeys, dogs, sheep and horses.

§ 214.

Among the SPURIOUS FORMATIONS, it appears that the lymphatic system, on account of the delicacy of its structure and the small quantity of cellular tissue therein contained, is not disposed to the formation of ENCYSTED TUMOURS. The lymphatic glands, however, to a certain degree, not unfrequently assume the form of encysted tumours; thus they become converted by suppuration and absorption into membranous bags filled with bloody ichor, thin lymph, a secretion containing lime, &c. The lymphatic system is affected with TUBERCULAR DISEASE the more frequently, as the latter is originally seated merely in it. The formation of a peculiar substance, similar to white fresh cheese, is also here the peculiar characteristic of this disease,[1] in which the lymphatic vessels often inflame, thicken, are stopped up with scrofulous matter, and are even converted into more or less long, thick, hard strings: the glands first inflame; subsequently, in consequence of the deposition of scrofulous matter, harden, thicken, become pale, and at last soften from their centre and run into suppuration. Not

unfrequently in those parts where the glands lie near each other, as, for instance, in the neck, on the spine and mesentery, many of them are converted into one large scrofulous swelling. SARCOM and CANCER[2] appear to occur primarily in the lymphatic system but very rarely; but not unfrequently secondarily, as the infection from the originally diseased parts is easily propagated to the neighbouring lymphatic glands agreeably to the course of the lymph.[3] In medullary sarcom of the testicle we very frequently observe a similar sympathetic affection of the lymphatic glands on the spermatic cord, pelvis and spine, more or less high up, in which case also the *ductus thoracicus* frequently becomes at the same time affected.[4]

(1) Compare § 65. I have myself observed some instances in which the thoracic duct, and the lymphatic glands in its neighbourhood, were scrofulous. Compare my Selt. Beob. Part II. No. 33, p. 76. I have since seen some other instances.—Older cases may be found in *Lieutaud*, Hist. Anat. Med. Vol. II. p. 243, Obs. 770, 771, 771 a.—*A. Cooper*, (first and second case.)—*Palletta* Exercit. Pathol. p. 109, fig. 4.

(2) Compare § 78, note 7. According to *Baron*, Delineations of the origin and progress of various changes of structure, &c. 4to. London, 1828, scirrhus should in all parts arise from a morbid change of the lymphatic vessels.

(3) To wit, from cancer of the breast in the axillary glands; of the lips and salivary glands in those of the neck; of the alimentary canal in those of the mesentery, and of the testicle in the pelvic glands, &c. The latter I have also seen in sarcocele.

(4) *A. Cooper*, (third case.)—*Rust* in *Horn's* Archiv f. d. medic. Erfahrung, 1815, p. 731—790, (two cases.)—*J. Wardrop*, Observations on Fungus hæmatodes, Case 21—24.—*Howship*, Practical Observations in Surgery and morbid Anatomy, Case 94.—*Gierl* in *Textor's* Neuen Chiron. Vol. I. Part II. p. 273.—*Biermayer* Museum anatomico-pathologicum, No. 535. I saw a second interesting case in the same Museum, in 1827, No. 3906.—*Breschet* in Diction. des Scienc. médical. Vol. XX. Art. Hematode, p. 196, under the name Carcinome abdominal.—*Keutel* in *Rust's* Magazin f. d. ges. Heilkunde, Vol. XVI. p. 226.—My Selt. Beob. Part II. p. 76, (since in another case.)—*Dickson* in Edinb. med. and surgic. Journ. April, 1825, No. 83.—*Zink* in Journ. compl. du Dict. des Sc. medicales, Vol. XXI. March, 1825.—*Rissler* in Ars Berättelse om Svenska Läkare-Sällskapets Arbeten, lemnad of *Ekstroem*. Stockh. 1825.—*B. H. Coates* in Philadelphia Journ. of the med. and phys. Sciences by *Chapmann*, Vol. IV. No. 2.—Also in melanosis tuberculosa of the horse, (§ 67), an uninterrupted string of large swellings between the rump and the termination of the aorta. v. *W. Cullen* and *R. Carswell* in Transact. of the med. chir. Soc. of Edinburgh, 1824, Vol. I. No. 13.

§ 215.

Lastly, in the lymphatic system we observe VICES OF CONTENTS, inasmuch as, by their absorbing activity, they are sometimes able to take up extraneous substances. Thus we find them not unfrequently filled with PUS, BLOOD, BILE, CANCEROUS ICHOR,[1] and rendered very distinct by the darker colour of these fluids. The glands also sometimes assume an unnatural colour from the matters absorbed; thus, for instance, the glands in the neighbourhood of the liver are often completely yellow, those in the region of the spleen brownish,

and the bronchial glands, especially, blackish from a juice similar to Indian ink,[2] which in previous difficulty of breathing is often found very dark, and deposited in large quantity. We however find also sometimes, in other parts, single lymphatic glands or vessels blackish, particularly if melanosis be connected with schirrus and medullary sarcom. LIME has been several times found in the lymphatic vessels, and sometimes in such quantity that they are completely filled by it.[3] In stonemasons and other persons who breathe much dust, it appears to be absorbed in the lungs and deposited in the bronchial glands.[4] A stone has been once found in the *ductus thoracicus.*[5] INTESTINAL WORMS, viz. *filaria hominis bronchialis,* Rud. have also been found in the absorbent vessels and lymphatic glands of the neck.[6]

(1) I have seen this several times, and this cannot offend the surgeons, as they derive fevers, affections of various kinds, and death from the irritation excited in the circulation by malignant pus and gangrenous ichor received into it. Compare the novel and interesting experiments of *Velpeau, Gendrin, Leuret, Trousseau, Dupuy, Hamont, Rochoux,* &c. On the inoculation and injection of putrid blood and pus.

(2) *G. Pearson,* On the colouring matter of the black bronchial glands, and of the black spots of the lungs, in Phil. Trans. 1813.—*Nasse* in *Meckel's* Archiv f. d. Physiol. Vol. II. p. 445.

(3) *Portal* in *Lieutaud,* Vol. II. p. 243, Obs. 771 a, (the thoracic duct.)—*Cheston* in Phil. Trans. 1780, Vol. LXX. p. 323, 578, (the thoracic duct.)—*J. G. Walter* in Mém. de l'Acad. des Sc. of Berlin, 1786 and 1787, p. 21, (the lymphatic vessels of the small intestines.—*Mascagni,* p. 29. — *Cruikshank,* p. 74.—*Assalini,* p. 52, (the thoracic duct.)—*Goodlad,* (the thoracic duct.)—*Scarpa,* On the expansion of bone and callus after fracture, translated into Latin, p. 63, 4to. Weimar, 1828, (the absorbents of the lower extremities, in a boy affected with pædarthrocacy.)

(4) Compare *Portal* Cours d'Anat. Medic. Vol. III. p. 511; Vol. V. p. 43.—*Sömmerring,* p. 45.

(5) *J. D. Scherb* De calculo in ductu thoracico, 1729; reviewed in *Haller's* Diss. Pathol.

(6) *Treutler* in Observ. Pathol. Anat. Auctuar. ad Helminthologiam hum. corp. continentes, p. 10, tab. 2, fig. 3—7, Lips. 1793; he calls it Hamularia lymphatica, and *Rudolphi* now names it Hamularia subcompressa; it has, not however, been seen again in the animal, and therefore may be considered doubtful.

TWENTIETH SECTION.

Of the Nervous System.

First Chapter.

Of the Brain.[1]

A.—OF THE MEMBRANES OF THE BRAIN.

§ 216.

It is very natural in the close connexion with which the membranes of the brain stand, on account of their situation and expansion in reference to the skull and the brain, that they should participate in almost all the malformations, diseases, and injuries of those organs; and as, on the one hand by isolation, they frequently prevent the extension of the diseases of the brain-case to the brain, and contrariwise of the brain to the bones, so on the other hand they sometimes produce mutual infection. Thus we find, for instance, in congenital as well as acquired malformation of the brain, the membranes naturally formed on a similar type; in abnormal situation of the brain, as in hernia cerebri and hydrencephalocele, the hernial sac is often formed of all the three membranes; and in penetrating wounds of the brain, its membranes are naturally injured with it. In hemicephaly, and often also in hydrencephalocele, in which more or less of the vault of the skull is deficient, the two external membranes are more or less consolidated with the here undeveloped general covering and fibrous parts, and produce, together with these, the membrane oftentimes very thin and transparent, which surrounds the brain.[2] The membranes are very frequently affected sympathetically and secondarily in diseases of the skull and brain, although they are often the seat of idiopathic and primary diseases, whereby then especially, congestion, inflammation with its consequences, and effusion between them of various kinds of fluids are produced. Those frequent and important diseases which appear to belong especially to the nervous system, as many fevers, viz. yellow and typhus fever, diseases of the mind, nostalgia, epilepsy, convulsions, *tetanus*, *delirium tremens*, *cephalalgia*, palsy, apoplexy, &c., have often, as either cause or consequence, vices of the brain as well as of the cerebral membranes.[3]

(1) *Jason a Pratis* De cerebr. morbis. 8vo. Basil, 1549.—*Haller's* Bibl. med. pr. Vol. I. p. 511.—*Montagnana* Consil. de ægritudinibus cerebri. Fr. 1604.—*Fr. Hildesheim* Spicilegia de cerebri et capitis morbis internis. Fr. 1612.—*Thom. Willis* Pathologiæ cerebri et nervosi generis specimen. Amstelod, 1663.—*Cuminius* D. de cerebro ejusque pathologia in genere. Leid. 1684.—*J. J. Wepfer* Observationes medico-practicæ de affectibus capitis. Scaph. 1727.—*de Büchner* D. de morbis cerebri ex structura ejus anatomica deducendis. Erford, 1741.—*Lazerme* De morbis internis capitis. Amstelod, 1748.—*Payva* Epicrisis de morbis cerebri et mentis qui extra cerebrum originem ducunt. 4to. Rom. 1751.—*Moor* Pathologia cerebri. Amstelod, 1754.—*Gennari* De peculiari structura cerebri, nonnullisque ejus morbis. Parma, 1782.—*Van der Haar* Ueber die Beschaffenheit des Gehirns der Nerven und etlicher Krankheiten derselben. a. d. Holländ. Stendal, 1794.—*A. Winckelmann* D. hist. pathologiæ cerebri specimen primum. Göett. 1803.—*Burdach* Beiträge zur nähern Kenntniss des Gehirns in Hinsicht auf Physiologie, Medicin und Chirurgie, 2 parts. Leipzig, 1805 and 1806.—*Th. Mills,* Of the morbid anatomy of the brain in typhus, or brain-fever, &c. 2d edit. Dublin, 1818.—*Hebreart* Observ. sur quelques maladies du cervelet, du cerveau et de leurs membranes, &c. Paris, 1819.—*John Abercrombie,* Pathological and practical researches on Diseases of the Brain, &c. 8vo. Edinb. 1st ed. 1828, 2d 1829.—*John Cook,* A treatise on Nervous Diseases, Vol. I, on Apoplexy. Lond. 1820; Vol. II. on Palsy and on Epilepsy. 8vo. Lond. 1823.—*Georget* De la Physiologie du Systême nerveux et specialement du Cerveau; Recherches sur les maladies nerveuses en général et en particulier sur le Siège, la Nature et le Traitement de l'Hysterie, de l'Hypochondrie, de l'Epilepsie et de l'Asthme convulsif, Vol. II. Paris, 1821.—*J. Swan,* Observations on some points relating to the anatomy, physiology and pathology of the Nervous System. 8vo. Lond. 1822, with engravings.—*J. C. Prichard,* A treatise on the diseases of the Nervous System, Part I. comprising convulsive and maniacal affections, London, 1822.—*Craigie,* Observations on the pathological anatomy of the Human Brain, &c. in Edinb. med. and surg. Journ. Jan. 1823, Vol. XVIII. p. 487; Vol. XIX. p. 63.—*F. Lallemand* Recherches anatomico-pathologiques sur l'encephale et ses dependances, 2 vols. Paris, 1824-29.—*G. F. J. Sahmen* die Krankh. des Gehirnes und der Hirnhäute, pathol. diagnostisch betrachtet, Riga, 1825.—*Guerin de Mamers* Des irritations encephaliques et rachidiennes, &c. Paris, 1825.—*Th. Mills,* An account of the morbid appearances exhibited on dissection in various Disorders of the Brain, &c. Dublin, 1826.—*Rob. Hooper,* The morbid anatomy of the Human Brain. 4to. London, 1826, with 15 coloured plates.—*Raikem* Observations sur quelques maladies de l'encephale et particulièrement sur l'inflammation et ramollissement de cet organe, in Répert. gén. d'Anat. et de Physiol. pathologique, 1826, Vol. I. No. 2, p. 271—321; No. 3, p. 74.—*A. L. J. Bayle* Traité des maladies du cerveau et de ses membranes, Paris, 1826.—*J. G. Fourcade* Maladies nerveuses des auteurs rapportées à l'irritation de l'encephale, des nerfs cerebro-rhachidiens et splanchiques avec ou sans inflammations. Paris, 1826.—*J. Sablairoles* Recherches d'Anatomie et de Physiologie pathologiques, relatives à la prédominance et à l'influence des organes digestifs des enfans sur le cerveau. Montpellier, 1826.—*Bompard* Considérations sur quelques maladies de l'encephale et de ses dependances, &c. Paris, 1827.—*A. Monro,* The morbid Anatomy of the Brain, Vol. I. Hydrocephalus. Edinb. 1827.—Compare the writers on INSANITY, especially *Haslam,* Observations on Insanity, with practical remarks on the disease, and an account of the appearances on dissection. 8vo. London, 1798.—*J. E. Greding's* Melancholico-maniacorum et epilepticorum quorundam, in ptochotropheo Waldhemiensi defunctorum sectiones in *Ludwig's* Adversar. med. pract. Lips. 1771, Vol. II. and III. and Sämmtl. medic. Schriften, edited by *K. W. Greding,* 2 vols. Greiz. 1790 and 1791.—*Chiarugi* Della Pazzia ingenere e in specie, con una centuria d'osservazioni, Vol. III. 8vo. Firenze, 1794.—*B. Hofrichter* D. de locis in melancholia affectis, 8vo. Halæ, 1797.—*Brian Crowther,* Practical remarks on Insanity, to which is added a commentary on the dissection of the brains of maniacs, &c. Lond. 1811.—*Andr. Marshall,* The morbid Anatomy of the Brain in mania and hydrophobia, &c. by *S. Sawrey.* Lond. 1815.—*Spurzheim,* Observations on the deranged manifestations of the mind, or insanity. London, 1817, with engra-

vings. — *Georget* De la Folie. Paris, 1820. — *Falret* De l'hypochondrie et du suicide. Paris, 1822. — *Buzorini* Untersuch. üb. d. körperl. Bedingung. der versch. Formen von Geisteskrankh. 8vo. Ulm, 1824.—*Neumann* in *Hufeland's* Journ. d. prakt. Heilk. July, 1824, p. 3—64, (fifty cases.)—*Pinel*, fils, Quelques recherches sur le siège des altérations cérébrales; and observations thereon by *Bouillaud* in *Magendie's* Journ. de Physiologie, 1826, Vol. VI. No. 1, p. 19.—*Esquirol* Allgemeine und specielle Pathologie und Therapie der Seelenstörungen deutsch von *Hille* nebst einem Anhange von *Heinroth*. Leipz. 1827. On APOPLEXY especially, *Morgagni* De sed. et causis morbor. Epist. II.—V.—*Wepfer* Hist. apoplecticorum observationibus et scholiis anatomico-medicis illustratæ. 4to. Scaphus. 1658, nov. edit. access. Auctuarium historiarum et observationum similium. Scaphus. 1675.—*Kirkland*, Commentary on apoplectic and paralytic affections, &c. Lond. 1792.—*Portal* Second Mémoire sur l'Apoplexie in his Mémoir. sur la nature et le traitement de plusieurs maladies, Vol. II. No. 10.—*Reil* and *Hausleutner* De locis in apoplexia affectis, 8vo. Halæ, 1795.—*J. Cheyne*, Cases of Apoplexy and Lethargy, with observations upon the comatose diseases. London, 1822.—*Riobè* Observations propres à resoudre cette question: L'Apoplexie dans laquelle il se fait un épanchement de sang dans le cerveau, est elle susceptible de guerison? Paris, 1814. — *Rochoux* Recherches sur l'Apoplexie. Paris, 1814. — *Bricheteau* in Journ. compl. du Dict. des Sc. médicales, Vol. I. p. 129—152, and 289—317.—*Moulin* Traité de l'apoplexie, ou Hémorrhagie cérébrale, etc. Paris, 1819. — *Serres* in Annuaire medico-chir. des hôpitaux et hospices civils à Paris, 1819.—*Romberg* in *Horn's* Archiv für medic. Erfahrung. p. 405—447, May and June, 1823.—*A. Ziegler* Ueber den Schlagfluss in pathologisch anatomischer Hinsicht in *Oken's* Isis. Vol. XX. Part X. p. 851.—Compare further, *Portal* Sur la nature et le traitement de l'Epilepsie, 8vo. Paris, 1827.—*Rob. Manisch*, The Anatomy of Drunkenness. 8vo. Glasgow, 1827, and *Barkhausen* Beobachtungen über den Säuferwahnsinn oder das Delirium tremens. 8vo. Brem. 1828. — Lastly, also many authors on Typhus.—Interesting single treatises on the Pathological Anatomy of the Brain are furnished by *Th. Anderson*, Pathological Observations on the Brain, in Transact. of the Soc. of Edinb. Vol. II. p. 17.—*R. Powell*, Some cases illustrative of the Pathology of the Brain, in Medical Transactions, Vol. V. p. 198.—*Gilb. Blane* in Transact. of the Soc. of Med. and Chir. knowledge, Vol. II. p. 192.—*Labonardiere*, in *Sédillot's* Recueil période. de la Soc. de Méd. Vol. L. p. 261, 337, 363. — *Rampont, ib.* Vol. LV. p. 19. — *Ever. Home* in Philos. Transact. 1814, Part II. p. 469.—*Nasse* Zur nähern Kenntniss der organ. Gehirnkrankheiten in *Horn's* Archiv f. medic. Erfahrung, May and June, 1821, p. 375.—*Duncan*, jun. in Edinb. Med. and Surg. Journ. No. 68, July, 1821.—Collections from the unpublished medical writings of the late *C. H. Parry*, Vol. I. p. 274, London, 1825.—*Thilow* in *Pierer's* Allgem. medic. Annalen, Nov. 1827, Part XI. p. 1441.—*Earle* On paraplegia in London Med. and Chir. Transact. 1827, Vol. XIII. No. 18.

(2) I can, however, almost always separate the continuation of the common integument from the dura mater as a thin transparent layer resembling the skin of the young embryon. Compare § 44, note 2.

(3) In no instance do we find greater difficulty than in the brain, in making the result of dissection agree with the phenomena of disease previously exhibited. We often observe during life the most violent symptoms indicating affections of the brain, whilst the examination presents either none or very trivial vice in that organ; in other instances, on the contrary, we frequently observe manifold, very extensive and important anomalies in the brain and its membranes, of which, during life, there was not the least suspicion. It is especially important here to distinguish correctly which is cause or consequence of the preceding disease. Violent and repeated irritation of the brain, occurring in fevers, madness, convulsions, headach, continued drunkenness, &c., and metastatic affections of the brain in neighbouring eruptive diseases, gout, puerperal fever, &c. easily produce congestion of blood, secretion of air and lymph, and states similar to those produced by inflammation. The kind of death itself, as well as the changes to which the body as a corpse is subjected, are here also worthy of notice.

§ 217.

As to the DURA MATER alone, it is affected indeed with the same irregularities as other fibrous parts;[1] but it exhibits many peculiarities dependent principally on its situation and connexion. Its FORM and SIZE depend generally on that of the skull and brain, and according as they are too small, undeveloped, too large, half doubled, awry, &c. so are they in various ways abnormal. Sometimes the falciform process is entirely or only partially deficient,[2] as is also the tentorium.[3] Tolerably often we observe in the falciform process, especially towards its lower edge, more or less large openings, in consequence of which both hemispheres of the cerebrum may adhere to each other. When the two hemispheres of the cerebrum are unsymmetrical, it is placed awry, and sometimes pushed upwards and sidewards by swellings of various kinds. In hydrocephalus internus, hernia cerebri, and hydrencephalocele, the dura mater is sometimes generally or partially expanded to a great extent,[4] although in both the latter diseases, it is sometimes also perforated by holes, through which the cerebral membranes and the brain itself protrude. The dura mater frequently varies from its normal THICKNESS: thus it appears atrophic, in parts even entirely absorbed, especially if long-continued pressure have been made on it;[5] sometimes and more frequently it is remarkably and morbidly thickened, so that it produces indentations in the brain itself.[6] It is remarkable that it has sometimes been observed, especially in diseases of the mind and in hydrophobia, unnaturally DRY, SHRIVELLED, AND EVEN PARCHMENT-LIKE.[7] Its COLOUR also is sometimes irregular in men and animals, viz. transparent, grey, more or less red under inflammation; in contusion, suppuration, mortification, and other diseases, sometimes yellow, dusky, bluish, brownish, even blackish; in jaundice of a yellow colour,[8] and in *melanosis*, spotted with black from the well-known pigment.[9]

(1) Compare Sect. VII. § 145—154.

(2) This is always the case if the cerebrum be undivided; see further on: if it be single in front, but divided behind, the falciform process first begins to appear where the division is, viz. at the coronal suture. The falx, however, sometimes appears in a well-formed brain to be completely or partially wasted by absorption.—*Garengeot* Splanchnologie, Vol. II. p. 211.—*Günz* and *Springsfeld.* v. *Burdach* Beiträge, Vol. I. p. 87.—*Haller* Op. minora, Vol. III. p. 863. Obs. 61.—*Carlisle*, v. Transactions of the Soc. for the improvement of med. and surg. Knowledge, Vol. I. p. 212, (in a woman twenty-nine years old it was completely absent.)—*Alex. Ramsay*, Anatomy of the Heart, Cranium, and Brain, p. 38. Edinb. 1803, found it entirely absorbed, and the two halves of the cerebrum united.

(3) If in monsters the posterior lobes of the cerebrum are deficient, the tentorium is also wanting. v. *Eller* and *Roloff* in Hist de l'Acad. des Sc. de Berlin, 1754, p. 112. In a girl of seventeen years old, who was idiotic and

motionless from birth, the hinder part of the tentorium was deficient. v. *Gilbert* in Edinburgh Med. and Surg. Journ. No. 95, April, 1828, (from absorption, as the dura mater was also very much wasted at the base of the skull.)

(4) I have observed a rare case in a cyclopic pig, No. 2346 of my Verzeichn.; here the cavity of the skull communicates with the large orbit by a wide aperture, through which the dura mater projects into it, and there forms at the hinder part a peculiar space, in which a part of the cerebrum is lodged.

(5) For instance, in tumours of various kinds; most frequently it arises from granulations of the brain, by which it is thus frequently perforated.

(6) I have seen it half an inch thick at some parts; which was also observed by *Bonetus* Sepulchretum anat. Vol I. p. 41, Obs. 82.

(7) *Lieutaud*, Hist. anat. med. Vol. II. Lib. III. Obs. 3, 16, 76, 165.—*Bagliv* De fibra motrice in Op. omn. Lib. I. cap. 5, p. 287. Antwerp, 1715. — *Littre* in Mém. de l'Acad. des Scienc. 1705.—*Trecourt* in Journ. de Médec. Vol. VI. p. 189.—Shrivelled up and like a half-dried bladder in a man who died of rupture of the stomach. v. *B. Brown*, in London med. Repos. 1822, Feb. Vol. XVII. No. 58, p. 108. This state is indeed a consequence of inflammation.

(8) *Stoll*, Ratio Medendi, Vol. III.—I have indeed but once seen it pale yellow, although I have dissected a dozen cases of jaundice; also in yellow fever it is found, though rarely, of a yellow colour.

(9) *Bonetus.* — *Gendrin* Histoire anatomique des inflammations. 2 vols. 8vo. Paris, 1826.—In an old man I have found a very large spot of a soot-like colour, without suspicion of mortification.

§ 218.

The CONNEXION of the dura mater with the skull is often so far irregular, that it is either too firmly attached, and even perfectly adherent to certain parts of the brain-case, especially at the top of the skull, in consequence of previous inflammation; or, on the contrary, it is only loosely connected with the bones, so that in opening the head, the skull-cap falls off of itself. Rarely from internal causes, but more frequently from external concussion, is a part of the dura mater entirely separated from the skull,[1] and then, in consequence of a collection of blood, of fluid or coagulated lymph, or of pus,[2] it is expanded like a bladder; tumours also of various kinds, as exostoses, sarcoms, cancerous tumours, &c. which grow from without into the cavity of the skull, often thrust the dura mater before them.[3] Sometimes also the connexion of the dura mater and the skull is destroyed by collection of water between them,[4] and even the two layers of the membrane itself are in rare cases separated from each other by water, pus, blood, and tumours.[5] VICES OF CONTINUITY arise not merely from penetrating, shot, thrust, and trepan wounds, but also very easily from indented and splintered pieces of the skull. Sometimes the dura mater is torn by very violent extension from within, as, for instance, in water of the head.[6] As fibrous parts are but imperfectly reproduced, so is the dura mater also rarely restored after loss of substance; but there is usually formed in its stead, at those spots, a thick cellular tissue, which is closely connected with the newly-formed bone, or if the bone be not reproduced, it assumes a

fibro-cartilaginous condition, and becomes consolidated into a common cicatrix with the general integuments, which in many cases produces only a weak membrane for the brain, and may therefore be easily burst from internal expansion.[7]

(1) Sometimes, as I have myself occasionally seen, on the opposite side to that on which the blow was received.

(2) Pus collects here also in consequence of inflammation, and without antecedent mechanical influence.

(3) *Schneider* D. de fungo hæmatode. Berol. 1821.—*Schwarzchild* D. de fungis capitis. 4to. Heidelbergæ. 1825, with four lithogr. plates.—*Sandifort* Museum anatomicum, Vol. III. p. 158, No. 127. — *Lisfranc* in Nouv. Biblioth. méd. May, 1827.—*Abercrombie*, (fourth case,) p. 426.

(4) *Bonetus* Sepulchret. anatom. Lib. I. Sect. II. Obs. 45, p. 116.—*Klinkosch* Progr. quo hydrocephalum fœtus rariorem ejusque causam proponit. Pragæ, 1773. —I have occasionally seen in hydropic children the flat bones of the skull completely separated by water from the dura mater. — *Greding* saw it in insane persons. v. *Ludwig* Adversaria med. pract. Vol. II. p. 469.—*P. Frank* Epit. de cur. hom. morbis. VI. 1, p. 161.—*Voigtel* Handb. Vol. II. p. 9, had also one case.

(5) To wit, from bloody serum, v. *J. Paisley* in Edinb. medic. Essays, Vol. III. p. 304; from seven ounces of blackish ichorous fluid, v. *Biermayer* Museum anat. pathol. No. 94; the dura mater was found separated, by coagulated blood, into two, and even three layers, v. *Kilian* Anat. Untersuchung des 9ten Hirnnervenpaares, p. 127; and *Lobstein* Compte rendu sur les travaux anatomiques. I. p. 56; the layer which is lined by the arachnoid coat was separated from it by pus, v. *Vicq D'Azyr* in Mém. de Paris, 1781, p. 497.

(6) We frequently find such rents in the cerebral membranes of hemicephalic monsters; in extensive hydrocephalus the water escapes by the nostrils, or penetrates through the sutures of the skull. v. *Cavallini* Collezione istorica di casi chirurg. 4to. Firenzi, Vol. II.—In one instance a large quantity of water flowed through the nose, and the membranes of the brain subsequently cracked; an external dropsical swelling was produced. v. *J. Baron* in Med. chir. Trans. Vol. III. Part I. No. 3.

(7) The dura mater burst in a violent fit of hooping-cough, seven months after trepanning. v. *E. Stanley*, Med. chir. Trans. Vol. III. p. 24. ff.

§ 219.

VICES OF TEXTURE in the dura mater are of proportionally rare occurrence. We often indeed see it injected and congested, when in a state of morbid irritation in fevers of various kinds, in cephalalgia, convulsions, epilepsy, hydrophobia, in staggers in the horse, &c., or when the blood is retained in the vessels of the brain, as occurs in many kinds of death, but especially in that from suffocation.[1] TRUE INFLAMMATION[2] occurs idiopathically from internal causes but rarely;[3] more frequently from mechanical[4] and chemical[5] agency, or consecutively to *caries* of the skull, inflammation of the ear, suppuration of the brain, &c. Inflammation of this membrane sometimes proceeds to the effusion on its outer surface of a FALSE MEMBRANE consisting of fibrous matter, and to ADHESION with the skull,[6] with the other cerebral membranes, and even the brain itself; sometimes to SUPPURATION, in which the pus is found between its layers, and on its inner or outer surface, and in

the latter case may erode and perforate the skull;[7] sometimes it runs into GANGRENE;[8] sometimes, lastly, into THICKENING and INDURATION, the latter of which may even assume the character of fibro-cartilage.[9] Probably also OSSIFICATION of the dura mater arises from inflammatory irritation.[10]

(1) On varices of the veins of the dura mater, compare § 205. On aneurism of the meningeal arteries, § 196, note 7.

(2) *Burdach* Vom Baue und Leben des Gehirns. Vol. III. p. 18, in which he applies to this the name of *Perimeningitis.*

(3) The accounts of its inflammation in yellow fever, typhus, madness, &c. for the most part originate in confusion between congestion and inflammation in the other cerebral membranes. *Hooper*, pl. 1, gives an engraving of a portion of inflamed dura mater.

(4) After injuries of the head, not penetrating through the skull; viz. after contusion, concussion, cuts, extirpation of tumours, &c. in consequence of the connexion of the vessels of the pericranium with the dura mater.

(5) After the imprudent use of the moxa, of the actual cautery, of corroding applications, of blows, in denudation from exposure to atmospheric air; in the latter case the inflammation of the dura mater which occurs is often a regenerating process. Although also in other persons, yet still more frequently in insane people. v. *Greding*, Vol. I. p. 293. *Georget* De la Folie, p. 486.

(6) I have occasionally found this on several distinct spots; it always appears after wounds of the brain.

(7) Such cases are described by *Burserius*, *Morand*, *Brisseau*, *Pietsch*, *Marchetti*, *Barrere*, and *Abercrombie*. *M'Turk*, in medical and phys. Journ. April, 1819; further, *Fizeau* in Nouv. Journ. de Médecine, Chir. et Pharm. Vol. XI. p. 523, and *Roux*, *ib.* Vol. XII. Sept. 1821; in the latter case, and in that of *Morand*, union occurred after trepanning. Concerning such cranial fistulas, comp. *Marvide* in Mémoires sur les sujets, proposes pour le prix de l'Academ. royale de Chir. Vol. IX. 1778, and *Richter's* chirurg. Bibliothek. Vol. IV. Pt. IV. p. 730.

(8) This seems to occur but rarely; I have never seen them, except in wounds of the brain which have become gangrenous, in cerebral abscesses, and in caries of the skull; the melanotic colouring of the dura mater, v. § 217, note 9, cannot be confounded with gangrene. Sometimes the dead dura mater exfoliates.

(9) To these belong the gummata in syphilitic persons, of which *Lieutaud* speaks, Vol. II. p. 372. Lib. III. Obs. 205. It is difficult to determine where the pustulæ miliares, mentioned by *Lieutaud*, Lib. III. Obs. 16, belong; perhaps they were, at least in one case, purulent cysts. Sometimes fibrous matter is effused between the two layers of the dura mater, producing swellings which form for themselves pits in the brain; viz. *Abercrombie*, Case 6, p. 47, (half an inch thick, $5\frac{1}{2}$ inches long, and $2\frac{1}{2}$ inches wide.)

(10) Ossification of the dura mater itself is, according to my observations, as rare as that on the arachnoid coat lining it is common; as it is often firmly connected with the dura mater, which, by the pressure of the greater thickness of the bony concretion, is wasted; so, in careless examination, it is often improperly considered as a growth from the dura mater. Calcareous deposits, however, do occur in the dura mater itself, as I have seen a few times in diseases of the brain, in which the dura mater was studded with little bony points and flakes; for example, in an epileptic person, and in No. 3983 of my Verzeichn. Compare *Albrecht* præs. *Boehmer* D. de ossificatione duræ matris singulari observatione illustrata. 4to. Halæ, 1764.—*Pohl* Progr. de dura matre passim ossea facta. 4to. Lips. 1764.—*Velten* Casus aliquot memoratu digni ossificationum in membranis cerebri inventarum, D. Bonnæ, 1825, with two lithographic engravings. Compare further on § 224.

§ 220.

Lastly, to the SPURIOUS FORMATIONS, which in rare cases we observe on the dura mater, belong, first, FATTY and

ENCYSTED TUMOURS, which sometimes are found only upon it, at other times between its layers, and contain even hair:[1] next, SCROFULOUS TUMOURS,[2] which are found on both sides of the internal cerebral membrane, as well as between its separate layers: and, finally, SARCOMATOUS and CARCINOMATOUS TUMOURS, some of which, passing from without through the natural or morbid apertures in the skull, particularly through the orbits, perforate the dura mater, and produce on it, in the cavity of the skull, more or less large swellings;[3] others arise from the bones of the skull, and some from the dura mater itself. To the latter kind especially belong FUNGUS of the DURA MATER, *fungus duræ matris*.[4] This is a sarcom, and sometimes more closely resembles the so-called fleshy sarcom, sometimes more the medullary; it is of various colour and consistence, according as it belongs to one or other of these kinds, or is examined in the incipient firm, or subsequent spongy, fungous, inflammatory, and even suppurative state. Usually we find only one such swelling, sometimes, however, several;[5] at first they are small, but sometimes attain a very great size;[6] generally they are found on that part of the dura mater which lines the top of the skull, although sometimes also on that covering the lateral parts and base of the skull. If the fungus be situated on the outer surface of the dura mater, which is its most usual seat,[7] it perforates the skull to a greater or less extent by absorption, and appears externally on the head; but should it be placed on the internal surface, it grows more or less into the cavity of the skull. We often also find fungus of the dura mater connected with osteosarcom of the skull, *fungus cranii;* thus the latter, either by participation of the dura mater in the disease, or by its fibres only being separated from each other, grows through them into the cavity of the skull.[8]

(1) For example, an adipose tumour with hair in the substance of the tentorium. v. *Morgagni* Epist. anat. XX. No. 58.—In a new-born child with large dropsy of the head, No. 2891 of my Verzeichn., I found, situated externally upon the skull, between the common integument of the head, and the membrane formed by the dura mater and pericranium, many flat adipose swellings, with much black hair, and surrounded by fine cellular tissue; one of these tumours penetrated the dura mater, and was projected inwards in form of several similar swellings which lay on the dura mater and arachnoid coat;—two little fatty tumours, whence sprouted many hairs, were seen on the dura mater of a man which had been exposed by caries. v. *Fricke* Annalen der Chir. Abtheilung des allgemeinen Krankenhauses zu Hamburgh, Part I. 1828, p. 406. pl. 2.

(2) *Lieutand*, Lib. III. Obs. 218 a.—*Baillie's* Morbid Anatomy, p. 432, and *Sömmerring's* Addenda, note 517, and a plate in *Baillie's* Engravings, Fasc. X. pl. 5.—My Selt. Beob. Part I. p. 108, No. 59; My Verzeichn. No. 2357.—*Earle*, On paraplegia in Med. Chir. Trans. Vol. XIII. Part. II. No. 18.

(3) For instance, *Loder* Observatio Anatomiæ tumoris scirrhosi in basi cranii

reperti. 4to. Jenæ, 1779.—*Pfranger* D. Historia casus perrari de fungo duræ matris, prolapsum atque destructionem oculi bulbi efficiente. Erf. 1801.—*A. B. Hertel* D. patholog. anat. de cerebri et meningum tumoribus. 8vo. Berol. 1814, with plates.—Journal de Médecine continué, Vol. XVI. App. Bulletin, p. 83, (cancerous).—*Landmann* Comment. pathol. anat. exh. morbum cerebri oculique singularem. 4to. Lips. 1820, with three copper-plates, (according to the account, a cartilaginous tumour.)—My Selt. Beobachtungen, Part II. p. 86, No. 36.—My Verzeichn. No. 2356 (scirrhus of the neck projecting into the cavity of the skull), p. 88, No. 37.—My Verzeichn. No. 2353, (A medullary-sarcoma of the eye growing into the cavity of the skull, also described and represented in *Benedict's* Handbuch der prakt Augenheilkunde, Vol. II; and a cancerous tumour of the eye which grew into the cavity of the skull.—My Verzeichniss, No. 2352.)—*Panizza* Annotazioni anat. chir. sul fungo midollare dell' occhio, &c. fol. Pavia, 1821, with three plates.—*Hasse* D de fungo medullari. 4to. Berol. 1823 (from the orbit.) See below on the eye.

(4) Compare § 122, note 44.—The authors on Fungus Cranii—*Amatus Lusitanus* Centur. V. Obs. 8.—*Camerarius* in Ephem. N. Cur. Dec. II. Ann. VI. 1687, Obs. 99.—*Cattier* in Observ. medical. Obs. 15, p. 48.—*Pohl* in Actis eruditor. Lips. May, 1736.—*Scheler* præs. *Baldinger* D. de Epilepsia et capitis dolore ex tumore duræ matris scirrhoso et carie cranii ortis, p. 8. Jenæ, 1771—*König* in Ephem. Nat. Cur. Dec. II. Ann. I. No. 167.—*Salzmann* in Mém. de l'Acad. de Petersbourg, Vol. III. p. 275.—*Wathen* in Medical Observations and Inquiries, Vol. V.—*Viellard* in Journ. de Médecine, Vol. XVIII. p. 533. v. Comment. Lipsiensis, Vol. XIII. p. 257.—Edinburgh medical Commentaries, Vol. II. p. 286.—*Louis* Mémoires sur les tumeurs fongueuses de la dure mère in Mém. de l'Acad. de Chir. Vol. V. p. 1. Paris, 1774, in which also cases by *Ambr. Paré*, *Sievert*, *Robin*, *Rey*, *Legrand*, *Marrigues*, *Choppart*, *Volprecht*, *Jauchius*, *Grima*, and *Philippe*, are related.—*Gondange* in Mémoires de Montpellier, Vol. I. 1776, Hist. p. 111 (on the base).—*Acrel* Chir. Vorfälle a. d. Schwed. von *A. Murray*, Vol. I. p. 40. Götting. 1777.—*Steph. de Vigiliis de Crutzenfeld* Biblioth. chirurg. Vol. I. p. 732. Wien, 1781.—*Monro* in Medical Trans. published by the college of Physicians in London, Vol. II.—*Ed. Sandifort*, compare § 122, note 44, and Mus. anat. Vol. II. tab. 25.—*Baillie*, Morbid Anat. p. 433, and *Sömmerring*, Addenda, note 518.—*J. G. Walter* Anatom. Museum. 2d part, p. 112. 4to. Berlin, 1796, and Museum anatom. 4to. Berol. 1805, p. 131.—*Siebold*, compare § 122, note 44.—*Jos.* and *Carl Wenzel* Ueber die schwammigen Auswüchse auf der äussern Hirnhaut. fol. Mainz, 1811, with six engravings.—*M. Baillie* Engravings, p. 219. Fasc. X. pl. 5, fig. 1.—*v. Walther* in der Salzburger med. chir. Zeitung, 1813, Febr. p. 185.—*Poilroux* in Annal. de la Soc. de Médec. de Montpellier, Vol. XXXIII. p. 139.—*Montagnon*, *ibid.* Vol. XXXIV. p. 304.—*Hebreard* in Bulletin de la Faculté de Médec.—*Rudolphi*, v. *Hertel*, p. 15.—*Horn* Archiv f. medic. Erfahrung, 1815, Part V. p. 838.—*Langstaff* in Med. chir. Transact. Vol. II. p. 288.—*Biermayer* Museum anat. pathol. No. 285.—*J. G. Wolter* D. cont. descriptionem tumoris duræ matris, cujus substantia cerebro non dissimilis erat. Duisburg, 1817.—*Meckel* Handbuch der pathol. Anatomie. Vol. II. 2. p. 324, ff. (three cases of his own, one on the exterior, two on the interior of the dura mater.)—*Esquirol* in Dict. d. Scienc. medical. Vol. VIII. Art. Demence. p. 201, (at the base, on the clivus.)—*Windel* D. de fungo duræ matris. 4to. Goett. 1819.—*C. B. Tilanus* D. de fungoso duræ meningis excrescente, etc. 4to. Traj. ad Rhen. 1819.—*Palletta* Exercitat. pathol. Vol. I. p. 93—104.—*v. Walther* in his and v. *Gräfe's* Journal f. Chir. und Augenheilk. Vol. I. Part I. Vol. II. Part II. Vol. V. Part I.—*v. Klein*, *ibid.* Vol. III. Part IV. p. 614.—*Calliot*, v. § 122, note 44, (fungus cranii and duræ matris.)—*Kilian* Anat. Untersuchungen über das neunte Hirnnervenpaar, p. 127, 4to. Pesth, 1822, (congenital, in the Museum at Strasburgh.)—*Larrey* in Revue médicale. July, 1822.—*Isenflamm* Anatom. Untersuchungen, Erlangen, 1822, p. 166.—*Wishart.* Compare § 122, note 44.—*Weitzenmüller* D. de fungo duræ matris. 8vo. Gryphiæ, 1823.—*Esquirol* in Archiv. génér. de Médec. Dec. 1823, (on the left temple.)—Revue encyclopedique, August, 1828, (on the right sinus as large as a walnut.)—*Ritterich* in *Cerutti's* Pathol. anatom. Museum. Vol I. Part IV.

p. 5.—*Vingtrinier* in Archives générales de Médecine, May, 1824, (at the base of the skull on the bulb of the vein.)—*Hesselbach*, v. § 122, note 44, (fungus cranii and duræ matris.)—*Seerig* Comment. nonnulla de fungi duræ matris origine et diagnosi. 4to. Vratislav. 1825, with three lithographic tables.—*H. Schwarzschild*, v. § 122, note 44.—*Ch. Mayo*, in London medical and physical Journal, Vol. LVIII. p. 408, (in the right temporal pit.)—*Burdach* Vom Leben und Bau des Gehirns. Vol. III. p. 28, § 258.—*Hooper*, pl. 7.—*Churchill*, in London medic. and physic. Journ. March, 1827, (on the inside of the dura mater).—*G. Sandifort* Museum anatomicum. Vol. III. p. 147, No. 39, (a very large swelling arising from the ala of the sphenoid.) —*Riegling* D. quædam ad Fungi duræ matris pathologiam. 8vo. Berol. 1828.—*Abercrombie* (in tentorium) 42d case, p. 443, (on the base, large.)—*Chelius* Ueber den schwammigen Auswuchs der harten Hirnhaut nach eigenen Erfahrungen. fol. Heidelberg, 1828, with lithographic plates, and in Dict. des Sciences médicales, Vol. VIII. p. 291, (on the clivus.)—I have, up to this time, only thrice met with fungus of the dura mater, one large and connected with fungus cranii, v. Selt. Beob. Part II. p. 82, No. 35, engraved in *Seerig*, tab. I.; a second small one on the top of the right orbit, No. 2280, of my Verzeichn.; and a third, also small, and on the greater falx, No. 2281 of my Verzeichn., engraved in *Seerig*, pl. 3, fig. 3; all three attached on the inner surface of the dura mater;—in the Anat. Mus. at Strasburg, I saw three cases of fungus of the dura mater in the region of the longitudinal sinus, two of which were upon the internal surface of the dura mater.

(5) Two cases were found by *Walter* and *Klein*; three by *Sievert* and *Volprecht*; four by *Philippe* and *Meckel*; five by *Wenzel* and *Baillie*; fourteen by *Ritterich*; eighteen by *Sandifort*; many by *Horn*, *Rudolphi*, *Wishart*, &c.

(6) For instance, as big as a man's fist, in a case by *Burdach* and myself; as large as a goose's egg, in *Sandifort's*; as a second head in *Grim's*.

(7) *Wenzel* improperly considers that it occurs only on this part.

(8) There has been much disputation concerning the original seat of fungus duræ matris: sometimes it has been ascribed, as by *Louis* and *Wenzel*, to the dura mater; sometimes, as by *Sandifort*, *Siebold*, and more recently by *von Walther*, to the bones of the skull. But, in reality, it may arise in both, and also in the pericranium; and, as the bones of the skull are only a living organ, in connexion with their external and internal periosteum, it must soon, more or less, comprise all these parts. Osteosarcom of the skull, or fungus cranii, to which *von Walther* has recently had the especial merit of drawing the attention, and fungus duræ matris, are therefore merely different, although often simultaneously occurring forms of one and the same disease.

§ 221.

The diseases of the ARACHNOID and VASCULAR COATS of the brain, which are best treated of together,[1] are much more common than those of the dura mater, and naturally in closer connexion with the diseases of the brain, as that was with the diseases of the skull. But both these membranes, on account of their organic connexion with the brain and skull, are frequently sympathetically affected by their diseases. The most common pathological phenomena which have been noticed in them, are MORBID IRRITATION,[2] and actual INFLAMMATION, both of which, with their numerous consequences, are observed in their various degrees as the cause and effect of many diseases.[3] In particular, respecting INFLAMMATION OF THE MEMBRANES, *meningitis*;[4] this is sometimes an IDIOPATHIC and PRIMARY disease,[5] sometimes SYMPATHETIC

and SECONDARY, as in injuries of the head, high fevers in men and animals, erysipelas of the head, many eruptive diseases, in severe burns,[6] in hydrophobia, in gouty, puerperal, and other metastases, &c.; further, it is sometimes ACUTE, sometimes rather CHRONIC, and, lastly, very different in reference to its extent, as it often affects merely defined spots, merely the part lining the external or the internal cavities of the brain, and sometimes all the membranes throughout their whole extent; most frequently it occurs on that part of the membranes covering the upper half of the hemispheres of the cerebrum, more rarely on its base.[7] True inflammation of the ARACHNOID COAT ALONE, *arachnoiditis*,[8] cannot be distinguished, on account of the deficiency of blood-vessels in this membrane; and the redness and injection which have been observed on it, arise from the inflamed subjacent mucous tissue, and the inflamed vascular coat of the brain, to which also must be referred, in part, the OPACITY, THICKENING, and MILKY COLOUR of the arachnoid membrane, which have been commonly considered as marks of its inflammation.[9] But inflammation of the *pia mater*, which is naturally the same as inflammation of the surface of the brain, is distinguished by the usual signs of inflammation.[10]

(1) Because both are cellular membranes, and are perfectly consolidated, not merely in the coats of the brain, but in general are inseparably united in the greatest part of the circumference of the brain in adults; and they are always, however, in organic connexion throughout, by means of fibro-mucous tissue of various length; and lastly, because their diseases have similar symptoms, and generally appear in both at the same time, and of the same kind.

(2) Compare § 51. Great injection of the finer arterial and venous vessels, is presented by and originates in mere congestion, in which only the veins are filled; the distinction between morbid irritation and true inflammation is more difficult, the latter of which terms has been much too often employed by the supporters of *Broussais*.

(3) Compare § 216, towards the end.

(4) *F. Herpin* Thèse. Meningitis, ou Inflammation des membranes de l'Encephale. 8vo. Paris, 1803.—*Parent-Duchatelet* and *Martinet* Recherches sur l'Inflammation de l'Arachnoide cérébrale et spinale, ou histoire théorique et pratique de l'Arachnitis. 8vo. Paris, 1821.—*Piorry* De l'irritation encephalique des enfans, ou considérations sur les causes, les symptomes, et le traitement de la maladie designée successivement sous le nom de convulsions internes, d'hydrocephale, aiguë, d'arachnoidite, etc. 8vo. Paris, 1823.—*A. Cucavaz* D. de arachnoite. 8vo. Patav. 1825.—*Senn* Recherches anatomico-pathologiques sur la meningite aiguë des enfans et ses principales complications. Paris, 1825.—*Bayle* on Meningitis chronica in Revue medicale, Feb. 1825; and on Meningitis acuta, *ib.* 1827, Vol. I. and II.—*Tacheron* Recherches anat. patholog. sur la médecine pratique, Vol. III. p. 4—36, Paris, 1823, under the name of Arachnoidite.—*Gendrin* Hist. Anatom. des inflammations, 2 vols. 8vo. Paris, 1826.—*Abercrombie*, Path. and pract. obs. on diseases of the Brain and Spinal Marrow. p. 49.

(5) Perhaps also in phrenitis in men and animals, in many convulsions, in mad staggers in horses, &c. According to *Bayle*, a chronic inflammation of these membranes is the most common cause of disturbance of the mind, with the exception of congenital idiotcy; in delirium tremens there is usually meningitis. v. *Barkhausen* Beobachtungen über den Saüferwahnsinn, oder das delirium tremens. Bremen, 1828. The same is also said to be the case in Nostalgia,

v. *Larrey* Recueil de Mémoires de Chirurgie. Paris, 1827;—also in softening of the stomach. v. *Camerer* Versuch über die Natur der krankhaften Magenerweichung, Stuttgard, 1828; lastly, also, castration in sheep and fowls often produces inflammation of the brain and cerebral membranes. v. *Faneau Delacour* in Journ. Univers. des Sc. Méd. June, 1824.

(6) In a child, who died the third day after having been scalded with hot water, over almost the whole body, I found distinct meningitis; *Eklund* also found, in three persons who were burnt by the explosion of gunpowder, congestion of blood in the cavity of the skull. v. Ars Berättelse om Svenska Läkare-Sällskapets Arbeten, lemnad of *Ekström.* Stockholm, 1827, p. 55.

(7) I have, however, seen it here also very distinctly several times.

(8) Not arachnitis, as inflammation of the arachnoid coat is called.

(9) It has always appeared so to me, on the closest examination, and I have found the redness produced by the vessels of the mucous tissue, and the pia mater, lying beneath the arachnoid; I do not, however, deny, that in the arachnoid itself a peculiar state, similar to the inflammation of other parts, may occur; at least, thickening, loosening, and deposition of plastic lymph, in its tissue, is a frequent phenomenon.

(10) As the pia mater, in a healthy state, is also extremely vascular, so we must not, as is commonly done, take every great injection of it for inflammation.

§ 222.

To the most important anatomico-pathological phenomena of the cerebral membranes belong the changes which are produced by morbid irritation and inflammation in relation to the QUANTITY and QUALITY of the SECRETED FLUIDS. The examples are rare in which, without suspicion of putrefaction, AIR is found between the two layers of the arachnoid coat, as well as between it and the vascular coat, whereby they are separated, in bladder-like spots.[1] Or there may be too little serum, and the membranes therefore appear ALMOST DRY and SHRIVELLED TOGETHER. The opposite vice, or an UNNATURAL COLLECTION OF A WATERY OR LYMPH-LIKE SECRETION, between the membranes and in the ventricles, is very common. This appears, in many cases, to take place during the agony of death, and even immediately after death,[2] partly as the product of many diseases and weakness preceding death.[3] In the so-called SEROUS APOPLEXY, *apoplexia serosa,* palsy and death are commonly produced by pressure of the serum effused between the membranes of the brain and into the cavities, although the effusion does not seem to be the cause of this disease.[4] Should the quantity of water found in the cavity of the skull be greater, we call it INTERNAL DROPSY OF THE HEAD, INTERNAL WATERY HEAD, *hydrocephalus internus,*[5] which is again divided into DROPSY OF THE CEREBRAL MEMBRANES, *hydrops membranarum cerebri,*[6] and DROPSY OF THE VENTRICLES, *hydrops ventriculorum cerebri,*[7] both of which, as is natural, often occur at the same time. In the former kind, which is much more rare than the latter, and usually to a less extent, the water is contained in the

bag of the arachnoid coat, that is, between the outer layer connected with the dura mater and the inner which envelopes the brain;[8] and the arachnoid then produces, in rare cases, as a congenital vice, elongated bags, which protrude through holes in the skull, and have much resemblance to hydrencephalocele.[9] The water is less frequently contained in closed bags of the arachnoid coat,[10] between it and the vascular membrane, or between the latter and the brain.[11] But in dropsy of the ventricles, which is the most common, and the kind which produces almost all the large watery heads, the water is collected in the bags of the arachnoid and vascular membranes which line the cavities of the brain, so that it is either contained in all or the greater number of the cerebral cavities at the same time, which is most commonly the case, or only in one of them.[12] The cause of this collection of water in the head is usually an inflammatory state of the membranes and of the brain itself, which may produce this effect at every period of life; but naturally only in the embryon,[13] and in young children on account of the yielding of the skull, can lead to a great effusion of water, whilst at a later period, when the skull cannot be further expanded, there is no room for a large collection of water. From this and other causes, internal dropsy of the head is sometimes an acute, sometimes a chronic disease, which in the latter instance sometimes even wears itself out in riper age,[14] and often acquires an enormous size.[15] The effused serum is generally quite pale, thin, and clear, although sometimes light brown, turbid, flocculent, containing albumen, and of a yellowish or red colour from the blood mingled with it.[16]

(1) Compare § 51. — *Morgagni* De sed. et caus. morbor. Epist. IV. 19, 26, 35; V. 17. 19; VIII. 9; IX. 9; X. 17; XIV. 35; XLVIII. 38; LIII. 26; LIV. 39, 49; LVII. 14.—*Halliday* D. de pneumatosi. Edinb. 1806.—*Briere* in Nouvelle Biblioth. de Médec. Feb. and March, 1826.—I have several times seen it without suspicion of putrefaction; twice in persons who died of tetanus, as *Morgagni* in the latter case, and once in a paraplegic person. Compare also *Portal* Cours d'Anat. Méd. Vol. IV. p. 70, ff.

(2) I have very often found this in persons who had been hanged, drunk, and in one case of a person destroyed by choke-damp; several times also in people who had quickly died from injury of the head. I have met with a quantity of similar cases in the reports of the morbid examinations at the Royal Medical College, and have particularly remarked some cases in which great extravasation of water into the cerebral cavities, and between the membranes, had occurred in persons destroyed by strangulation and by blows on the head, which was considered by less experienced practitioners as a morbid state existing previous to the injury.

(3) To wit, in acute fevers, especially yellow and typhus fever, scarlet fever, measles with affections of the head, diseases of the mind, nostalgia, epilepsy, convulsions, tetanus. v. *Speranza* in Anno clinico-medico. Parma, 1823–24.—Delirium tremens, hydrophoby, softening of the stomach, asthma, consumption, rickets, and various cachectic diseases, distemper in dogs, sleepy staggers in horses, diabetes mellitus. v. *von Stosch* Versuch einer pathologie und therapie des

diabetes mellitus, p. 103, Berlin, 1828.—Also in drunkards and old people serum is frequently found between the membranes and in the cavities of the brain; this is, however, by no means to be regarded in the latter as an abnormal condition; as *J. Carson* has observed, on the circulation of the blood in the head, Edinb. med. and surg. Journ. No. 79, 1824, April, p. 261. — The EASY SEPARATION of the vascular membrane from the brain, which is observed in some bodies, seems to me to originate in the effusion of lymph beneath the pia mater loosening their connexion. Compare *Camerarius* D. de apospasmate piæ matris. Tubingæ, 1722.—Mechanical causes, however, as concussion, may produce this loosening.

(4) There is no proportion between the quantity of fluid effused and the violence of the symptoms prior to death, and the more or less speediness of the latter; compare *Morgagni* De sed. et caus. morb. Lib. I. Epist. IV.: often is the quantity of fluid much less in this than in other diseases, in which no, or very indistinct, symptoms of pressure of the brain exist.—*Abercrombie*, p. 253, also holds, that extravasation is not the cause but the consequence of apoplexy.—[*Abercrombie* says 'sometimes.' T.]—Probably apoplexy and exudation arise from one and the same cause.

(5) The INTERNAL, to distinguish it from the EXTERNAL, *hydrocephalus externus* or *œdema capitis*, in which the water is found between the skull and the external teguments. As to writers, compare *de Plouquet* Repertor. Art. Hydrops capitis, *Reuss* Repert. Commentat. Vol. XIII. and Dictionnaire des Sciences médicales, Artic. Hydrocephale, and above, § 122, note 10.—The most valuable of the modern writers are *Morgagni*, Epist. XII.—*Kaltschmid* Progr. de hydrocephalo interno raræ magnitudinis. Jenæ, 1752. — *Fothergill* in Medical Observations and Inquiries, 1771, Vol. IV. — *Klinkosch* Pr. de hydrocephalo fœtus rariori ejusque causa. Prag. 1773. — *Ludwig* D. de hydrope cerebri puerorum Lips. 1774.—*Odier* Mémoires sur l'Hydrocephale interne ou l'Hydropisie des Ventricules du cerveau in Hist. de la Soc. de Médecine à Paris, 1779, p. 194.—*G. Flajani* Osservazioni pratiche sopra l'Amputazione, l'Idrocefalo, etc. Roma, 1791. — *Quin* Abhandlung über die Gehirnwassersucht, Leipz. 1792. — *Bader* Geschichte der Wassersucht der Gehirnhöhlen oder des Schlagflusses der Kinder. Francof. 1794. — *Murray* resp. *Schulzen* D. fœtus hydrocephalo interno corrupti descriptio. Upsal. 1797. — *Kreysig* D. de hydrocephali inflammatorii pathologia. Viteb. 1800. — *J. B. Bott* D. de hydrocephalo. Edinb. 1800. — *Moffat* and *Armstrong* D. de apoplexia hydrocephalica. Edinb. 1700. — *Hopfengärtner* Untersuchungen über die Natur und Behandlung der verschiedenen Arten der Gehirnwassersucht. Stuttgard, 1802. — *Afzelius* resp. *Rislachi*, D. Hydrops ventriculorum cerebri historiis morbi et sectionibus cadaverum illustratus. 4to. Upsal. 1804.—*J. Young* D. de hydrocephalo interno. Edinb. 1804.—*T. Ferris* and *E. Sullivan* D. de hydrocephalo interno. Edinb. 1805. — *J. R. Lucas*, D. de hydrocephalo acuto. Edinb. 1805. — *J.* and *C. Wenzel* Bemerkungen über die Hirnwassersucht. 4to. Tubingen, 1806.—*P. Lee* D. de apoplexia hydrocephalica. Edinb. 1807.—*Bonsfield* D. de hydrocephalo acuto. Edinb. 1807.—*Ralston* D. de hydrocephalo. Edinb. 1808. — *M'Creery*, D. de hydrocephalo acuto. Edinb. 1808. — *Brown*, D. de apoplexia hydrocephalica. Edinb. 1808. — *J. Rand*, jun. Observations on the Hydrocephalus internus in Medical Communicat. of the Massachusetts med. Soc. Vol. I. p. 69. Boston, 1808.—*Cheyne*, On Hydrocephalus acutus, or water in the head. 2d edit. Dublin, 1819.—*Formey*, Von der Wassersucht der Gehirnhöhlen. Berlin, 1810.—*Sanders*, D. de hydrocephalo acuto interno. Edinb. 1810.—*Ferrai* and *Stormouth*, D. de hydrocephalo acuto. Edinb. 1811.—*Autenrieth* D. Observat. de hydrocephalo acuto, etc. Tubing. 1811.—*v. Portenschlag-Ledermayer* Ueber den Wasserkopf. Wien, 1812. — *Löbenstein-Löbel* Die Erkenntniss und Heilung der Gehirnentzündung, des innern Wasserkopfes und der Krampfkrankheiten im kindlichen Alter. Leipzig, 1813.—*Gölis* Prakt. Abhandl. über die vorzüglichsten Krankheiten des kindl. Alters. 1st. Vol. von der hitzigen Gehirnhöhlenwassersucht. 2d Vol. vom innern chron. Wasserkopfe und den verschiedenen Arten des äussern Wasserkopfes. Wien, 1815 and 1818. 2d edit. Wien, 1824.—*J. Ferguson* D. de hydrocephalo. Edinb. 1816.—*H. Guthrie* and *J. Wylie* D. D. de hydrocephalo acuto. Edinb. 1816.—

Yeat, A statement of the early symptoms which lead to the disease termed water on the brain. 8vo. London, 1815; and an Appendix to the same, with cases. London, 1819. — *Coindet* Mémoire sur l'hydrencephale, ou cephalite interne hydrencephalique. Paris, 1817. — *Hecker* Antiquitates hydrocephali. Berol. 1817.—*Abercrombie* in Edinb. med. and surg. Journ. Vol. XIV. p. 292.—*J. Inglis*, D. de hydrocephalo. Edinb. 1817. —*J. Squair*, D. de hydrocephalo acuto. Edinb. 1817. — *Fillans*, D. de Hydrocephale acuto. Edinb. 1818. — *Brachet* Essai sur l'hydrocephalite ou Hydropisie aiguë des ventricules du cerveau. 8vo. Paris, 1818.—*de Leon* D. de hydrocephalo. Edinb. 1819.—*Schütz* D. de hydrocephalo acuto, 8vo. Halæ, 1819.—*J. S. Boettger* D. de hydrope cerebri. 8vo. Berol. 1819.—*Reusch* D. de hydrocephalo. 8vo. Berol. 1820.—*Moulin* Traité de l'Apoplexie ou hémorrhagie cérébrale, considerations nouvelles sur les hydrocéphales; description d'une hydropisie cérébrale particulière aux vieillards. 8vo. Paris, 1819. — *Mathey* Recherches sur les charactères distinctifs, et sur le traitement de l'hydrocephale interne in Journ. de Médec. cont. Vol. XI. p. 651.—*Duffin* and *H. Symes* D. D. de hydrocephalo. Edinb. 1821.—*Stansfield* D. de hydrocephalo acuto. Edinb. 1821.—*Clendinning* D. de hydrocephalo acuto. Edinb. 1821.—*Levi* D. brevis de Hydroc. tractatio. Berol. 1822. — *R. Johnston*, D. de hydrocephalo. Edinb. 1823. — *Barry* D. de hydrocephalo acuto. Edinb. 1823. — *Campe* D. de hydrocephalo acuto. 8vo. Halæ, 1823. — *Weber* D. de hydrocephalo. Wirceb. 1823, s. — *Dörrer* D. de hydrocephalo chronico senili. 8vo. Wirceb. 1826.—*Mitivie* Beobachtungen und Bemerkungen über die hitzige Gehirnhöhlenwassersucht bei den Kindern, nach d. Fr. von *G. Wendt*. Leipz. 1823.—*A. J. Wenzel* D. de hydrocephalo congenito. 8vo. Berol. 1823.—*Ritter* Morbi hydrocephali historia. 8vo. Berol. 1824. — *Kiens* D. de hydrocephalo chronico. 8vo. Riga, 1825. — *Rabe* D. de hydrocephalo ventriculorum cerebri acuto. 8vo. Berol. 1824. — *Fischer* D. de hydrocephalo acuto. 8vo. Berol. 1824.—*Bergmann* anat. pathol. Untersuchungen über Hirnwassersucht in *Nasse's* Zeitschrift für die Anthropologie, Part I. 1825. — *Bamberg* D. de hydrocephalo acuto. 8vo. Berol. 1826. — *Ayre*, Researches into the nature and treatment of Dropsy in the brain, chest, abdomen, ovarium, and skin. Lond. 1826.—*Duges* in Ephémérides médicales de Montpellier, 1826. — *Rudolphi* Ueber den Wasserkopf vor der Geburt, in Abhandl. der K. Akad. der Wissenschaften. Berlin, 1826–7, p. 1, pl. 1, 2, and 6, (in the last plate a beautiful engraving of the brain.) — *E. Ehrenberg* D. exh. Hydropis cerebri casum rarissimum. 4to. Berol. 1826, with engravings.—*E. W. Otto* D. de hydrope cerebri acuto. 4to. Leipz. 1827.—*A. Monro*, The Morbid anatomy of the Brain, Vol. I. Hydrocephalus. Edinb. 1827. — *Mills* in Dublin Transactions of the Association of Physicians, Vol. V. 1828.—*Levrat* Aperçus theor. et prat. sur les causes, la nature et le traitement de l'Hydrocephale aigüe maladie particulière du premier age. Lyons, 1828. — *J. Brevis* D. de hydrope ventriculorum cerebri acuto. 8vo. Berol. 1828. — *C. Himly* Demonstratio hydrocephali humani memorabilis in Comment. Soc. reg. Scient. Goting. recentior. Vol. VI. Class. physic. p. 61; and *Langenbeck* De cerebro aqua ingenti sacciforme distento, cum nondum perfecto conferendo, *ib.* p. 73, pl. 1—5, (engravings of the brain.)—*Meckel* has collected many individual cases in his Handb. der pathol. Anatomie, Vol. I. p. 260, ff.—*Burdach* Vom Leben und Bau des Gehirns, Vol. III. p. 514. — Some interesting, or, from their anatomical investigation, very instructive cases are given in the Edinb. med. and surg. Journ. Vol. II. p. 369.—*Clarke*, Vol. V. p. 264; Vol. VIII. p. 364; Vol. IX. p. 398; Vol. XI. p. 453. — *Coley* in Vol. XIV. p. 401; Vol. XVII. p. 240, 471 and 510; Vol. XIX. p. 173. — *Breschet* in *Magendie's* Journal de Physiol. Vol. I. p. 92; Vol. II. p. 269; Vol. III. p. 241.—Bulletin de la Faculté de Médec. Vol. VII. p. 332.—Archives générales de Médecine, July, 1823.—*Howship*, Pract. observ. in Surgery and morbid Anatomy (twenty-sixth case, with an engraving of the brain.)—*Baxter* in Medical Repository, new series, New-York, 1817, Vol. IV. Part III. (100 ounces of water in the brain.)—*Tacheron*, Vol. III. p. 37—59.—*Baron* in Bulletin de la Société de Médec. Vol. IV. p. 432. — *Ulrich* and *Mayer* in *Meckel's* Archiv f. die Physiologie, Vol. VI. p. 523, and Vol. VII. p. 423.—*Georget* in Nouv. Journ. de Médec. Vol. VII. p. 193.—*Seeger* in *Rust's* Magazin, Vol. II.—*Krüger-Hansen* in *Graefe*

and *Walther's* Journ. der Chir. Vol. IV. p. 541, (congenital, nineteen inches in circumference.)—*Wetter* in *Harles's* Rhein. Jahrb. fur Med. und Chir. Vol. III. Part III. p. 65.—*J. Glover* in Chapmann's Philadelphia Journal of the med. and phys. Sciences, Vol. II. No. 1, (between the membranes.)—*Duncan*, jun. in Trans. of the med-chir. Soc. of Edinb. Vol. I. 1824, No. 7, (136 ounces of water in the arachnoid and in the ventricles, the hemispheres very much separated from each other.)—*Millar* and *Robertson, ib.* Vol. II. 1826.—*Pascoli* Uebersicht über das im Jahre, 1825-6, in der medic. prakt. Schule zu Inspruck geflogene Heilverfahren, Inspruck, p. 81, 1827, (the child, aged one year, weighed twenty-five and a half pounds; its head alone weighed twenty-one pounds.) Internal hydrocephalus happens frequently among beasts, and often to a great extent in calves, horses and sheep; much less frequently in dogs, cats and pigs. Of other animals no examples are known to me.

(6) Also *hydrops cerebri externus*, and *hydrocephalus internus*, in old people, which dropsy of the ventricles cannot. We may also call it *hydrocephalus meningeus.* — *Meckel*, Handbuch der pathol. anat. Vol. I. p. 264, calls this external dropsy of the head, in contradistinction to dropsy of the ventricles, which, however, may easily give rise to confusion of ideas. According to *Monro*, the water from the ventricles may be effused into the membranes by rupture, which, however, at least is not in general the case. v. *Monro*, Observations on the eye, the ear, and the brain, p. 38.—Even in one case of congenital dropsy of the brain, No. 2891 of my Verzeichn. in which there was an aperture, no water escaped.

(7) Also *hydrops cerebri*, *hydrops cerebri internus*, and *hydrocephalus encephalodes.*—*Gall* distinctly pointed out that all the large dropsies of the head belonged to this kind.

(8) Observations of good cases are given by *Wepfer* Observat. anat. de apoplexia. Hist. XIII. and XIV.—*Kaltschmid.*—*Loftie* in Medic. Observat. and Inquiries, Vol. V. No. 13, p. 121. —*Wrisberg*, v. Salzburg. medic. chir. Zeitung. Vol. I. 1805, p. 88.—*Hartell, ib.* p. 94.—*Mier* in Samml. auserles Abhandl. zum Gebr. prakt. Aerzte. Vol. XI. p. 214.—*Flajani*, *Hufeland*, *Glover*, and *Duncan*, &c. In the cases of *Kaltschmid*, *Loftie*, *Flajani*, and *Glover*, water was found merely between the skull and the brain; in the others also at the same time water in the cavities of the brain. I have several instances of the latter kind; of the former I have found but two in new-born children.

(9) *Penada* Saggio d'osservazioni e memorie, etc. 4to. Padua, 1793, (large on the occiput.)—*Textor* in Neuen Chir. Vol. I. Part III. p. 469, (on the fontanel, apparently without connexion with the brain.)—*Meckel* Descriptio monstrorum nonnullorum, p. 52, 4to. Lipsiæ, 1826.—As in hydrencephalocele the protruded bag of the brain is sometimes merely membranous, it requires a close examination, though the watery cyst, which was cured by ligature, might at least in part belong here. v. *E. Thompson* in London Medical Repository, Nov. 1824.—In a monster which had dropsy with an undivided brain, No. 2888, of my Verzeichn., the very expanded arachnoid having fallen together, protruded on the temple through a hole in the dura mater and the membrane of the skull to the general tegument, and here formed at first sight an encysted tumour; perhaps water had been previously contained in it; the pia mater passed smoothly before the inner opening, and contributed somewhat, as well as the brain, to the formation of this tumour.

(10) *Metzger* Biga Observat. p. 3. — *E. Ehrenberg*, p. 16, and an engraving; the watery cyst was situated between the other parts of the hemispheres of the cerebrum.—*Meckel* Descript. monstr. nonnull. p. 57. 4to. Lipsiæ, 1826.

(11) *Morgagni* relates many instances. I myself have also found some, although in these cases it appears to me that the quantity of water is always but small. Compare *Camerarius*.

(12) *A. Portal* Sur une hydropisie particulière des ventricules lateraux du cerveau, etc. in Mém. de Paris, 1770, p. 240.—In adults I have seen occasionally water in the lateral ventricles, though never in great quantity. In some children which had watery heads, I have seen one hemisphere of the brain much more distended by water than the other, although there was water both in it and in the middle ventricle. In hydrops cerebri hydatidosus the partial expansion of

one ventricle is naturally more common.—*E. Home* observed a considerable quantity of water in the third ventricle, and in the septum lucidum, without there being any in the lateral ventricles. v. *Baillie's* Morbid Anatomy, p. 447.—In an idiot five ounces of water were in one case found in the cavity of the septum lucidum. v. *Vingtrinier* in Revue Médic. franç. et étrang. Vol. VIII. p. 299—304, July, 1822.

(13) Chronic water in the head is so frequently congenital that *Meckel*, Handbuch der pathol. Anat. Vol. I. p. 260, allows of no other. I know, however, no reason why the causes of water in the head should not operate just as much immediately after as before birth; and there are really many cases given of water in the head occurring in healthy children of one, two, or more years old, after falls, blows, metastases of eruptive diseases, &c. The formation of water in the head of the fœtus is especially important in midwifery, as perforation of the head is often necessary. Compare *Hebenstreit* D. de capitonibus. Lips. 1743. v. *Haller* Select. Diss. Anat. Vol. VI.—Very small embryons have been seen with water in the head, viz. *Osiander* Annalen der Entbindungslehr-anstalt zu Göttingen, Vol. I. Part II. p. 58, 61, and Handbuch der Entbindungsk. Part II. p. 291, (in embryons two or three months old.)—*Rudolphi*, tab. 1, fig. 1, (in an embryon about two months old.) I have a similar case before me, No. 2938.—A description and plate of a six weeks' old fœtus, with water in the head, is given by *Meckel* Descriptio monstr. nonnull. p. 83, pl. 5, fig. 2. 4to. Lips. 1816.—Probably also here belongs the case by *Mende*, in Nov. Act. Acad. Nat. Cur. Vol. XI. Part II. p. 443, pl. 53, fig. 2; although the author considered the brain healthy. Sometimes there is a marked disposition to water in the head, as several sisters have been affected with this disease. v. *Portal*, Vol. IV. p. 73.—*Odier* Med. chir. Abhandl. a. d. Fr. Leipz. 1798.—Recueil période. Vol. VI. p. 289.—*P. Frank* De cur. hom. morb. Epitome, Vol. IV. p. 337; (five sisters died in their first year of acute hydrocephalus.)—*Goelis* mentions that in one family three, in another seven sisters had water in the head.—In another case seven sisters were affected with this disease, of which only the youngest was cured. v. *Rolph* in London med. Repos. Sept. 1824.

(14) Even to the twenty-fourth year, v. *Riedlin* in Ephem. Nat. Cur. Cent. I. and II. Obs. 29;—*Schmitt* in Salzburg. med. chir. Zeitung, 1800, Vol. IV. p. 233;—to the twenty-fifth year, v. *Howship*;—to the twenty-ninth year, v. *Michaelis* in Medical Communications, Vol. I. No. 25;—to the thirtieth year, v. *van Swieten* Commentar. p. 123, § 1217;—*Büttner* Beschreibung des innern Wasserkopfes und des ganzen Beinkörpers einer von ihrer Geburt bis ins 31te Jahr krank gewesenen Person weiblichen Geschlechts, Königsb. 1773;—*Thunberg*, v. Reisen in Afrika und Asien, v. Magazin von neuern Reisebeschreibungen, Vol. IV. p. 250;—to the forty-third year, v. *Schneider* in Annalen der Wetterauischen Gesellschaft, Vol. I. No. 24;—to the forty-fifth year, v. *Aurivillius*, resp. *Ekmark* De hydrocephalo interno 45 annor. Upsal. 1763, in *Sandifort* Thesaurus, Vol. II. No. 14;—to the forty-eighth year, v. *Osthoff* Kleine Beiträge, Vol. I. No. 4; even to the fifty-third year, v. *Gall* Anat. et Physiol. du Système nerveux en général, etc., p. 25, with a plate of the brain.

(15) Instances of very large watery heads in new-born children are given in *Marcorel* Mémoires prés. à l'Academie, Vol. IV. p. 458.—*Murray*.—*Stein* Geburtshülfl. Wahrnehmungen, Vol. I. No. 161.—*Wrisberg*, p. 92, (seven pints of water, the circumference of the head 30½ inches.)—*Osiander* Annalen der Entbindungsanstalt, Vol. I. Part II. p. 59.—*Krüger-Hansen* and *Pascoli*.—There is a remarkable case in Bresl. Mus. v. No. 2891, of my Verzeichn., which, though shrivelled up in spirits, measures even now 19 inches.—Old cases of large collections of water in the head are collected in *Portal*, Vol. IV. p. 73.—In a child a year and a quarter old, the head measured 32 inches round, and contained fourteen pints and a quarter. v. Schwäbischer Merkur, 1807, p. 310.—In a boy of sixteen years, 31 inches. v. *Millar* and *Robertson*.—In another, seventeen years, 24½ inches. v. *Blumenbach* Medic. Biblioth. Vol. III. p. 626, 1788.—In a girl of eighteen, 26½ inches. v. *Hufeland's* Journal, May, 1823, p. 129.—In the case of *Aurivillius*, the head contained eighteen pints of water.—In that of *Büttner*, twenty pints.—In that mentioned in Ephem. Nat. Cur.

Dec. III. Ann. I., as much as twenty-four pints. The circumference amounted to 29 inches, in a case of *Warner's*. v. *Benj. Gooch*, Cases and pract. remarks on Surgery, Vol. I. p. 37, 29 inches.—In that of *Büttner*, 30 inches.—In one of *Wrisberg*, 30½ inches.—In that of *Kaltschmid*, 33 inches.—In that of *Mackenzie*, Illustrations of Phrenology, Edinb. 1820, p. 24, pl. 6, fig. 3, as much as 36 English inches.—*Monro* saw one of 50 inches in circumference. v. Outlines of the Anatomy of the Hum. Body, Vol. I. p. 361.—I have mentioned above, § 122, note 10, several good cases. Sometimes the membranes and the brain are so expanded by the water, that the light may be seen through the head, which I have often noticed; or that the membranes have burst and the water been effused beneath the external tegument of the head, v. *Cavallini* Collezione istorica di casi chirurgici, Vol. II. 4to. Firenze, 1764; and *John Baron* in Medico-chir. Trans. London, 1817, Vol. VIII. Part I. No. 3; *Meckel* Anat. physiol. Beobachtungen und Untersuchungen, Halle, 1821, p. 135;—or it has escaped through the nose, v. *Kaltschmid* De nervis opticis in cadavere latis inventis, Jenæ, 1752, in *Haller's* Disp. pathol. Vol. I. p. 375.—*John Baron.*—*Miller* and *Robertson*, (an aperture was found above, to the right, and before the crista galli.) Perhaps here also belongs the case in *Meckel* Descriptio monstror. nonnullor. p. 57.—It has been already observed, that tearing of dropsical brains and their membranes is not rare.

(16) It has been improperly supposed, that the water here secreted in disease could be chemically distinguished by the coagulation of its contained albumen with acid and alcohol, from the healthy secretion of the brain, which, however, is never properly secreted in sufficient quantity for examination.—*Yeats*, p. 107.—Analysis of the fluid of watery heads is given by *Jordan* in *Crell's* Chem. annalen, 1801, Part VII. p. 50; Part VIII. p. 115.—*Mirabelli* and *Schreger* in *Horkel's* Archiv, Vol. I. Part II. p. 256.—*Marcet* in General views of the composition of animal fluids, by *Berzelius*, p. 55. London, 1812.—*Breschet* et *Barruel*, in *Magendie's* Journ. de Physiol. Vol. I. No. 1. p. 95.—*Haldat* s. Dict. des Sc. médical. art. Hydrocephale.—If it have been tapped, which treatment has been employed as a mean of cure, it easily is reproduced; compare *Lizars* in Edinb. med. and surg. Journ. 1821, Vol. XVII. p. 243 and 471; compare *v. Graefe* and *v. Walther's* Journ. d. chir. Vol. IV. Part I. p. 140.

§ 223.

In other cases, especially if the preceding inflammatory irritation have been violent, no distinct watery exudation has been observed between the cerebral membranes, but a more MUCOUS and ALBUMINOUS-LIKE STATE,[1] or a still thicker puriform PLASTIC LYMPH, which overspreads larger or smaller patches of the membranes, or sometimes forms FALSE MEMBRANES.[2] If the plastic lymph be more firmly coagulated, it gives rise to the various ADHESIONS and UNIONS[3] of the membranes, to their very distinct THICKENING and INDURATION,[4] as well also as, probably, to the production of the so-called CEREBRAL GRANULATIONS or PACCHIONIC GLANDS.[5] The latter are little roundish light-coloured corpuscules, of different consistence, and of the size of grains of millet, hemp, and even of little peas, which are found in greater or less number very commonly in the neighbourhood of the longitudinal sinus, although also on other parts of the arachnoid and vascular membranes, and not unfrequently, passing outwards from these, they penetrate through the dura mater itself.

(1) Often, also, in rheumatic affections of the head, in drunkenness, and in puerperal fever; sometimes the exudation resembles the buff of the blood in colour and consistence. Compare *Portal*, p. 79.

(2) *Morgagni*, Epist. LII. 8.—*Wrisberg* in *Haller's* Physiologie, note 74.—*Baillie*, p. 431, and *Sömmerring*, *ibid.* note 514.—*Baillie* gives a plate, in Engravings, Fasc. X. p. 215, pl. 4, fig. 1; and *Hooper*, pl. 1.—In a maniac, who had a very violent attack, a thick false membrane was found.—*Biermeyer.* v. Museum anat. pathol. No. 202.—*Flormann* in Svenska Läkare-Sällskapets Handlingar, Vol. VI. p. 219, (which covered the whole of the left hemisphere.) I have found it a few times, but almost always in the temporal region, attached sometimes more to the dura-materal layer, sometimes more to the cerebral layer of the arachnoid coat, sometimes between the latter and the vascular coat; on the latter, it has been several times found by *Abercrombie*, p. 51, 53, 56—61.

(3) *Baillie*, p. 245, and *Soemmerring* consider adhesion of the dura mater with the other cerebral membranes very rare, and this is, in reality, partially true, if we compare the arachnoid, in this respect, with the pleura or peritoneum. I have, however, found such union several times, sometimes fibrous and ligamentous-like, sometimes compact, and in large streaks. In congenital water of the head, and in tumours within the cavity of the skull, I have occasionally found extensive adhesions between the two layers of the arachnoid coat. Not unfrequently adhesions of that part of the membrane which lines the cavities of the brain also occur, as I have seen in diseases of the mind, in tumours, suppuration, and partial dropsy of one ventricle. Compare *Morgagni*, Epist. I. 14. IX. 25.—*Portal*, Vol. IV. p. 91, and *Esquirol*, in Dict. des Sc. Méd. Vol. VIII. Art. Demence, who observed adhesion of the membrane lining the lateral ventricles, in fifty-four mad persons, and also in others who were not insane.

(4) This thickening is often very distinct, and occurs both on the arachnoid and vascular membrane; in the former case, the thick membrane passes smoothly over the convolutions of the brain, in the latter it penetrates into the depressions between them. The membranous lining is also not unfrequently remarkably thickened. v. *Portal*, Vol. IV. p. 91.—*Greding* found the arachnoid and pia mater thickened in eighty-six out of a hundred insane people, in eighteen out of twenty-four melancholic, and in twenty-two out of thirty idiots. *Esquirol*, *Pinel*, *Georget*, &c., also often found it thickened in diseases of the mind. The pia mater is often apparently found thickened, on account of turgescence and rigidity of its vessels, as *Neumann* has properly observed, who found it but once actually thickened out of fifty mad people. v. *Hufeland's* Journ. July, 1824. p. 57, It is natural that the membranes should consequently lose their transparency, and become whitish or yellowish.

(5) Glandulæ Pacchionianæ. v. *Pacchioni*, Op. omn. p. 125, Romæ, 1741.—Granulations cérébrales. v. *Bichat* Anat. gén. Vol. III. p. 59.—*Portal*, Cours d'Anat. Médec. Vol. IV. p. 10, 44, first pointed them out as somewhat morbid; then more fully and completely in *Wenzel* De penitiori structura cerebri, Cap. 1. —Compare *Rosenthal* in *Horn's* Archiv, 1818, p. 406; he considers them as a product of the veins. Also in the vascular plexuses of the ventricles they are not unfrequent; and also, in an epilectic person, *Abercrombie*, p. 315, found such a concretion in the vascular plexus, as large as a hazel-nut.

§ 224.

More rare than the hitherto-mentioned results of morbid irritation and inflammation in the arachnoid membrane of the brain is ULCERATION, which is however naturally more commonly superficial ulceration of the brain rather than of the just-mentioned membranes.[1] As rare also is the termination in MORTIFICATION, which here occurs only secondarily, especially after severe injuries, and abscesses of the brain, &c. So much the more

frequent, as consequent on morbid irritation, are found STONY and BONY CONCRETIONS[2] in the arachnoid membrane. They are commonly seen on the external surface of the fold covering the dura mater, especially in the region of the vertex and on the falciform process, and often attain a very considerable size. Usually they are flat and splinter-like, although often tubercular and roundish, so that they penetrate into depressions of the brain, and even into the skull. They are very bulky, so that the investing layer of the arachnoid coat is often much thrust inwards or even entirely absorbed.[3] In rare cases they are produced, as in other serous membranes, in necked processes or bags, which project from the external layer into the cavity of the arachnoid coat.[4] Sometimes also the cerebral granulations give rise to bony concretions, as lime is secreted within them.[5] The bony concretions between the arachnoid and vascular coat,[6] as well as in that part of it which lines the cavities of the brain and produces the plexuses, are more rare and generally smaller.[7]

(1) I have seen a few cases, in which, after injury of the head, and suppuration in the ear, the cerebral membranes, which were secondarily inflamed, suppurated, without the brain appearing actually to be affected; in another case, without this complication, a case of meningitis was connected with a large collection of pus between the arachnoides and pia mater, at the base of the brain. A few interesting cases of suppuration are mentioned by *Abercrombie*, p. 58. Case 13 and Case 15, p. 61. On superficial suppuration, v. The Brain. The cerebral membranes often become yellow, greenish, brown, even blackish from suppuration and gangrene. We must not confound herewith the yellow colour which has been seen a few times in jaundice. v. *Morgagni* Epist. XXVII. 7.— *Buzzi* in Italian. Biblioth. Vol. III. Part II. p. 96. — *Dubrevil* in Ephémérides médicales de Montpellier, Aug. 1826, (in an embryon three months old.)

(2) Compare § 219, note 10. These bony concretions are very frequently considered the cause of headache, dizziness, epilepsy, apoplexy, insanity, suicide, &c.; but, as I think, cause and effect are here often confounded, as the flow of blood and morbid irritation, which occur in these diseases, as often give rise to morbid deposition of lime. Advanced age also appears to me to have no greater disposition thereto, than, that irritation of the brain more frequently occurs at that, and especially at a later period of life. I find, therefore, in the bodies of many old persons brought here for dissection, the formation of bone hardly more frequent in the cerebral membranes than in middle life, and usually only when other traces of affections of the head are present at the same time. On the contrary, I find large bony concretions also in young people who have died of disease of the brain; indeed, I have seen them congenital, to wit, very large in No. 2888 of my Verzeichn.; several instances of their existence also in children and young persons, are given by different writers. I have never found them in animals, though I have examined so many of their heads; nor, if I be not mistaken, are there any examples of them in any collection.

(3) I have found these modifications in various ways, viz. almost three inches long, and half an inch thick; round, of the size of a hazel-nut, or nutmeg. Compare No. 2277, 3123, 3975—3990 of my Verzeichn. and besides several interesting cases. In *Dr. Locher's* collection at Zurich, I saw a piece of bone, as big as the palm of the hand, on the dura mater. I have never found it on the tentorium, and therefore consider it very rare, although examples are given. v. *Lieutaud*, Part II. p. 324, Lib. III. Obs. 50; some instances in *Voigtel*

Handb. der path. anat. Vol. II. p. 26.—*Hutchinson* in Med. chir. Trans. Vol. II. p. 113. — Good engravings of such bony concretions are given by *Scheid* D. de duobus ossiculis in cerebro humano. Argentorati, 1687. — *Baillie*, Engravings, Fasc. X. pl. 4, fig. 2 and 3.—*Hooper*, The morbid Anatomy of the human Brain, pl. 5.—According to *van der Boon Mesch*, these concretions on the arachnoid consist especially of carbonate of lime; those on the dura mater of phosphate of lime (?) v. *Schroeder van der Kolk* Observat. anat. pathol. et pract. argumenti. Fasc. I. p. 34. Amstelod. 1826.

(4) See my Selt. Beob. Part II. p. 81, and No. 2276 of my Verzeichn. Compare § 81, 154, note 7, &c.—Here also seems to belong *Cruveilhier's* case. v. Essai sur l'Anat. path. Vol. II. p. 21; and perhaps also that of *Fabricius*, Cent. I. Obs. 81, p. 27, and *Greding*, Vol. II. p. 97.

(5) I myself have never seen this, though several instances are mentioned by *Greding* in *Ludwig's* Adversar. med. pract. Vol. II. Part III. p. 483.

(6) *Haller* De corp. hum. fabrica. Vol. VIII. p. 33; and in Op. minor. Vol. III. p. 363. — *Vicq d'Azyr* in Mém. de Paris, 1781, p. 498. — *Sandifort* Observ. anat. pathol. L. III. p. 45. — *Cheselden* Anat. of the human Body, p. 221.—*Greding* in *Ludwig's* Advers. med. pract. Vol. II. p. 428.—*Bichat* Anatomie générale, Vol. IV. p. 536.—*Meckel* Handb. der pathol. Anat. Vol. II. Part II. p. 206.—I have only found it here twice. v. Verzeichn. No. 3991.—*Hooper*, Part V., gives an engraving.

(7) *Laennec* also found it on the outer surface of the membrane lining the ventricles, but *Kerkring* and *Merklin* on the inner. v. Dict. des Sc. Méd. Vol. IV. p. 127.—Less frequently in the plexus choroides. v. *Süe* Osteologie de *Monro*, p. 20, note.—*Greding's* Sämmtl. medic. Schriften, Vol. I. p. 314.—*Sömmerring* Addenda to *Baillie*, p. 267 and 268. — *Walter*, Anatom. Museum, Vol. I. p. 155, No. 309.—*Chabert*, *Flandrin*, and *Huzard* Vollständ. Handb. der Vieharzneik. Vol. I. p. 420. — *Powel*, in Medical Transactions, Vol. V. p. 234, (earthy concretion.)—*Esquirol* in Dict. des Scienc. médicales, Vol. VIII. Artic. Demence (a cyst containing lime.)—*Asprey* in London med. and physic. Journ. (on each side, one as large as a pea.)—I have also sometimes found earthy and bony concretions in the plexus.)—*Bergmann* found, in the plexus of a mad person, about fifty little crystals. v. *Nasse* Zeitschrift f. Anthropologie, 1823, Part II. p. 416, and twenty cases of sand-like formation in the plexus. v. *Mende* Beob. und Bemerkung. aus der Geburtshülfe und gerichtl. Medic. Vol. III. Gött. 1826.

§ 225.

To the more important SPURIOUS FORMATIONS which are sometimes found in the arachnoid membrane and the external surface of the vascular membrane of the brain, belong especially the various kinds of TUMOURS which easily become injurious by pressure on the brain. These are, first, HYDATIDS[1] of different number and size, which in rare cases occur on the free upper surface of the arachnoid, between it and the vascular membrane, and very commonly and numerously in the plexuses of the lateral ventricles of the brain;[2] next, a kind of CYLINDRICAL, or CLUB-LIKE PROCESSES or NECKED BAGS, peculiar to serous membranes, arising from the arachnoid which lines the dura mater, and containing in their loose extremities commonly lymphatic concretions, gelatinous, bony, and cartilaginous matter;[3] further, true ENCYSTED TUMOURS,[4] and lastly, not very rarely, TUBERCLES,[5] by the breaking up of which CIRCUMSCRIBED BAGS OF PUS or ENCYSTED ABSCESSES may arise on the surface of the brain.

(1) Compare *Lüdersen* D. de hydatidibus. Goett. 1808, p. 10. — *Morgagni* Epist. XII. 6. — *Lieutaud*, Vol. II. p. 310; Lib. III. Obs. 4 and 4 a. — *Fischer* Hist. Tæniæ hydatigenæ, § 21, tab. I. — Several examples are collected by *Burdach* Beiträge, &c. Vol. II. p. 107 and 287.—I have found them a few times, but am unable to mention any thing certain as to the pathological phenomena.—*Esquirol* found a large hydatid in the arachnoid of an insane patient, v. p. 291.—Were the miliary cysts which *Pagenstecher*, v. *Harles's* Neue Rhein. Jahrbücher der Medicin und Chirurg. Vol. XII. Part III. p. 1, saw on the arachnoid, hydatids?

(2) I found them in persons subject to insanity, epilepsy, headache, &c.; also, however, in many others.—We often see many of them attached by fine threads, or single large ones, which separate the walls of the ventricles from each other.—A single large hydatid was found by *Devaux* in the right lateral ventricle of a person who died of nostalgia. v. *Fournier* Recueil de Méd. Chir. et Pharm. Milit. Vol. XI. p. 248.—*Rendtorff* saw a large hydrops vesicularis in the right ventricle of a girl eight years old. v. *Hufeland's* Journ. d. prakt. Heilk. Dec. 1823, p. 46, with a plate.—*Headington* found a very large hydatid in the left ventricle. v. *Abercrombie*, p. 436.

(3) Compare the preceding §, note 5. — I have found this anomaly three times.—In No. 2276 of my Verzeichn., there were found, besides the large bony concretions attached by threads, and in sacs with necks, four long appendages, with little blood-vessels in their necks, and a collection of turbid jelly in their thicker depending extremities. — No. 2278, from a horse, is similar, in which there are five appendages, about two inches in length, from which some cylindrical processes, similar to those of the gurnards, are produced.—In a third case, a long roundish tumour, filled with thick yellow jelly, is attached to a thin stem.—Doubtless, the finger-like appendages mentioned by *Lobstein*, Compte rendu sur les travaux Anatomiques, Strasburg, 1820, p. 50, belong here.

(4) For instance, in the late Duke of Saxe Gotha, one about six inches long and three broad upon the right hemisphere. v. *Dorl* and *Ziegler* in *von Froriep's* Notizen, Vol. X. p. 89.—*Esquirol* once found a cyst containing fatty matter on the plexus choroides.

(5) *Baillie's* Morbid Anatomy, p. 438.—*Leveille* found in an idiot tubercles as large as an egg between the dura mater and arachnoidea; read in the sitting of the Academy of Medicine, Aug. 10, 1824.—Many smaller tubercles on the vascular coat of a person who died of paraplegia. v. *Earle* on paraplegia, in Med. chir. Transac. 1827, Vol. XIII. No. 18. — *Abercrombie*, (seventy-ninth case,) p. 173.—Tubercles which have their origin in the cerebral membrane frequently appear to lie on the surface of the brain, of which I shall make mention further on. I have seen this distinctly in two cases.

§ 226.

Lastly, as to what belongs to VICES OF CONTENTS of the arachnoid and vascular membrane, it has been already above noticed, in speaking of the COLLECTIONS OF LYMPHATIC SECRETIONS to which inflammation of this membrane usually gives rise. We frequently find between the two layers of the arachnoid, although also between it and the vascular membrane, a considerable quantity of PUS, which may be here poured out from ulcers of the membranes, as well also as from the surface of the brain, and cerebral abscesses which have burst. We not unfrequently see in the just-mentioned situations, in injuries of the head and in apoplexy, COLLECTIONS OF BLOOD, in very different quantities.[1] Even PURE QUICKSILVER,[2] EXTRANEOUS BODIES which having penetrated from without and

remained here for a long time,[3] and PARASITIC ANIMALS,[4] have been observed in and upon the membranes of the brain.

(1) Little bloody specks have been seen on this membrane in severe meningitis; a few times also petechiæ. v. *Stoll* Ratio Medendi, Part II. p. 406, in petechial fever.—*Wood* in a girl who died of purpura. v. *von Froriep's* Notizen, Vol. VIII. No. 8, p. 127, (according to the report, in the dura mater, also between it and the lining layer of the arachnoidea.)—Effusions of blood are considerable in contusions of the cerebral membranes, and rupture of the dura mater, in which case the blood seems to be collected in a cyst in the arachnoid. In apoplectic persons also we often find the blood in a cyst of the arachnoid, not unfrequently between it and the pia mater, as well as beneath the latter. See further on the brain.—*Lobstein*, p. 46, found, in two maniacs, the arachnoid thickened and consisting of several layers, between which blood was effused; the brain had also become very much compressed. This seems to be an undescribed disease.

(2) *Muralt* Observ. chir. Basil. 1691, No. 208.—*Panarolus* Arcanor. Fasc. II. —*Boneti* Sepulchretum anat. Vol. I. p. 64, Obs. 114.—*Lieutaud*, Hist. anat. med. L. III. Sect. VIII. Obs. 558—562. Compare § 73, note 8.

(3) For instance, bullets, pins. *Flajani* found in a Russian, thirty years old, a needle two inches long in the cavity of the skull, close to the falx. v. *Valentin* Voyage médicale en Italie. Nancy, 1822. See below.

(4) The Gamasus marginatus. The worms in the brain described by old writers are merely threads of plastic lymph, which have been mistaken for them. It is true that fly maggots may find their way into the cavity of the skull through badly tended wounds of the head, but this will never occur at the present time.

B.—OF THE BRAIN ITSELF.

§ 227.

The BRAIN, together with the rest of the nervous system, is proportionally subjected to but few and rare malformations and diseases; and even those pathological conditions, which we consider especially grounded in this system, as mental and nervous diseases, appear but in very rare instances to have their primary seat in it.[1] But so much the more important are their organic vices, as besides the disturbance of the peculiar functions of this system, they are frequently, by their great influence upon the formative and reproductive activity of the organism, not merely detrimental to life,[2] but also, if they exist previously in the embryon, they have the greatest influence upon its development, and therefore appear to be the cause of many vices of formation in the fœtus.[3]

(1) Compare, for instance, the above quoted writers on Diseases of the Mind, and especially *Esquirol* in Dict. des Sciences Médic. Vol. VIII. p. 289; Vol. XXXII. p. 172, and his Therapie der Seelenstörungen, translated into German by *Hille*, p. 235 and 483, in which he mentions, that in the examination of the bodies of 277 insane persons he found but seventy-seven with vices of the brain; *Pinel* (the father) but sixty-eight out of 161. v. *Magendie's* Journal de Physiol. Vol. VI. No. I. p. 50; also *Georget*, De la Folie, did not find vices of the brain in one half of insane cases. *Bayle* considers chronic inflammation of the brain as the most frequent cause of diseases of the mind, excepting congenital idiotcy. Many of the vices of the brain which have been observed

are certainly only the consequence, and not the cause, of diseases of the mind. According to *Flourens*, diseases of the mind, as they are generally the consequence of organic vices, can only be connected with vices of the cerebrum. According to *Casauvieilh* and *Boucher's* Observations in diseases of the Muscular System, viz. epilepsy and catalepsy, the medullary substance is affected; but in the true diseases of the mind the grey substance. v. *Briere* in Nouv. Biblioth. de Méd. Dec. 1825.

(2) It is known that insane persons rarely become old, and that they are often affected with consumption.

(3) As the nervous system is, at every period of life, so intimately connected with the functions of circulation, secretion, and nutrition, so it is well known to have in the embryon the greatest influence upon the growth and proportional form of its several parts. Hence we also see the most varied formation of the face and the extremities connected with hemicephaly, hydrencephalocele, with singleness of the brain, spina bifida, &c., as I have already observed in several parts of my Selt. Beob., and since can confirm by copious collections of recent observations. And it is very satisfactorily shewn, especially by *Tiedemann* in Beobachtungen über die Beschaffenheit des Gehirnes und der Nerven in Missgeburten. v. Zeitschrift für Physiolog., edited by *Tiedemann*, *G. R. Treviranus*, and *L. C. Treviranus*, Vol. I. Part I. p. 56—110; Vol. III. Part I. p. 1—44.

§ 228.

To MALFORMATIONS of the brain belong, especially, the TOTAL OR PARTIAL DEFICIENCY of this organ,[1] either when the vault of the skull is simultaneously deficient, or even when that exists. To the former state is commonly applied the name of DEFICIENT BRAIN, *hemicephalia*, or *anencephalia*.[2] In both instances the cause of deficiency is dropsy of the brain at a very early period, which sometimes continues to enlarge till it bursts and is discharged, at other times is only more or less retarded in its external or internal formation.[3] In proportion as this disease affects the embryon at an earlier or later period, must the effect be very different. In hemicephalic monsters the brain is sometimes completely and entirely wanting, and the base of the skull, which alone exists, is merely covered with fine membranes, in which the origin of the cerebral nerves is attached; sometimes we find, covered with a thin membrane consisting of the common integuments and the dura mater, a larger or smaller rudiment of brain, occasionally mingled with hydatids, mostly broken to pieces, fallen together, soft, discoloured, soaked in effused blood, as it were macerated, and very imperfect in its internal organization;[4] sometimes, lastly, there is a part of the top of the skull present, but always less arched than natural, and there is then also a part of the brain tolerably normal, whilst another part lies loosely, and more or less destroyed, as in the preceding state, is torn or cicatrized. In those embryons, however, which are not hemicephalic, and are born with the top of the skull properly arched and even too large, the brain appears to be sometimes entirely, or for the most part deficient,

as, on account of the great degree of dropsy, the cerebral membranes, instead of being filled with brain, are, on the contrary, filled with water, so that, when, after the evacuation of the water, the head is opened, its cavity appears empty; usually, however, we find in its base more or less of the base of the brain, as also the anterior columns of the spinal cord, the cerebral tubercle, *pons varolii*, limbs, *crura cerebri*, and rudiments of the great ganglions, *thalami optici* and *corpora striata*.[5] In monsters with deficient face or with very small skulls, more or less of the fore part of the brain, even the whole cerebrum, is sometimes wanting, so that merely the cerebellum, and the oblong marrow, terminating in front in a rounded form, are present;[6] or the brain, even if completely existing, is still so imperfectly developed, that its normal divisions and internal organs are more or less lost.[7] The DEFICIENCY OF INDIVIDUAL SMALL PARTS OF THE BRAIN, with the otherwise normal form of the brain and of the face, is very rare.[8] The opposite vice, the EXCESS OF NUMBER in the parts of the brain, or the partial DUPLICITY of the brain, is very common in double monsters, and exhibits the same modifications as the consolidation of the two heads, so that, either according as the duplicity affects merely the fore or hind part of the skull, &c., so the brain also is only more or less double at its fore or hind part, or, when in some heads the cavity of the skull is double, two brains also are found, of which the one is sometimes very imperfect on account of the confined space.[9] Very rarely do we find in otherwise single brains, certain of their parts double or supernumerary.[10]

(1) Compare *Reuss* Repertor. Comment. Vol. X. p. 124—126, and p. 279.—*de Plouquet* Repertor. Art. Cerebrum deficiens, (the greater number of these cases relate to hemicephaly.)—*Geoffroy Saint-Hilaire* in Mém. du Museum d'Histoire naturelle, Vol. XII.—*J. H. Beck* Ueber den ursprünglichen Hirnmangel und über die Pathologie und Therapie des Gehirnblutflusses. Nürnberg, 1826, (on hemicephaly.)—*Dujés* in Ephémérides médicales de Montpellier, July, 1826, (on agenesia of the brain and congenital paralysis.) v. *Casauvieilh* in Archives générales de Médecine, May and July, 1827.

(2) Also called *acephalia spuria*, *acrania*, *microcephalia*, &c. Compare above, § 122, and on monsters.—Concerning the state of the brain v. *Meckel* Handb. der pathol. Anatomie, Vol. I. p. 195—260.—Instead of the name Hemicephali, for these monsters, *Béclard*, in Bulletin de la Fac. de Médec. 1815, p. 448, makes use of the name ἀσκυφοι, and *Meckel*, in Anat. physiol. Beob. p. 79, that of ἀνοροφοι.

(3) The more hemicephalic cases I have examined, the stronger is my conviction of the truth of the view which I took in my Monstror. sex humanor. anat. et physiol. disquisitio. 4to. Francof. ad V. 1811; and in Selt. Beob. Part I. p. 41.—*Morgagni*, Epist. anat. XX. Art. 56, and 57, and De sed. et caus. morbor. Epist. XII. 5—8. Epist. XLVIII. 50.—*Haller* Op. min. Vol. III. p. 136.—*Sandifort* Anat. Infantis cerebro destituti. L. B. 1784.—*Penada* Saggio di Osservazioni e Memorie, Vol. II. p. 55, were previously of this opinion, as also *Meckel* Handb. der pathol. Anatomie, Vol. I. p. 254, and Anat. physiol. Beobachtun-

gen und Untersuchungen. Halæ, 1822.—*Rudolphi* Ueber den Wasserkopf vor der Geburt.—*Tiedemann*, Vol. III. Part I. p. 35, and others, have supported it, both by their authority and by the grounds and comparisons which they have brought forward. If the various retarded formations are frequently connected with this malformation, it shews, as I think, not the originality of deficient brain; as water in the head, if it attack the embryon at an early period, may equally have, as a consequence, retardation of the development. I recently found an embryon six weeks old, which had hemicephaly, singleness of the brain, which was compressed, discoloured, and two large transverse slits in the parietes of the head. v. 8821, Bresl. Mus. On account of these slits, adhesion of the hemicephalic heads with the membranes of the ovum easily occurs. v. *Pole* in Lond. med. and phys. Journ. Vol. III. 1800, p. 397 and 497.—*Geoffroy* Philosophie anatomiq. p. 155. Paris, 1822.—*Cerutti* Rarior. monstri in museo anat. Lips. adservati descriptio anat. 4to. Lips. 1827.—*C. E. Rudolphi* D. Monstror. trium præter naturam cum secundinis coalitor. disquisitio. 4to. Berol. 1829, with plates. I have also had an opportunity of examining a similar case.

(4) In but very few cases, is there a difference to be observed between the cortical and medullary substance, but the whole consists rather of grey substance: if the brain be complete, some of its parts appear tolerably normal, although the hemispheres of the cerebrum are almost always diseased.

(5) Compare on Water of the Head, *Kerkring*. v. *Lieutaud*, Vol. II. Lib. III. Obs. 332.— *Santorini* v. *Morgagni*, Epist. XII. 6.—*Bromel* in Actis lit. Sueciæ, 1725, p. 93, Comment. Soc. Götting. Vol. IV. p. 113.—*Feiler* Ueber angeborene menschliche Missbildungen. Landsh. 1820, p. 5, note.—*Béclard* in *Magendie* Journ. de Physiol. Vol. II. p. 273.—I have myself seen one instance in a human fœtus, and a few of calves and sheep, in which the whole cavity of the skull was filled with a mere watery cyst, at the bottom of which only was there cerebral substance. Two imperfect descriptions of total deficiency of the brain in a boy of ten years old and a newly-born child, are given by *Martel* in Gazette de Santé. v. *Hufeland's* Journal, Octob. 1823, and *d'Alquen* in *Harles's* Rhein. Westphäl. Jahrb. für Medic. und Chir. Vol. X. Part I. 1825, p. 77; both cases seem to be nothing more than a high degree of water in the brain. *Breschet* once saw, in a child of three years and a half old, merely a thin membrane filled with water, instead of the entire outer side of the left hemisphere. v. Archives générales de Médec. July, 1823.

(6) To wit, *Carlisle* in Philos. Trans. 1801, Part I. p. 139—144, in a lamb, of which one ventricle was very large, probably from dropsy. I have seen a similar case in a lamb, but the cerebellum was only rudimentary.

(7) *Bianchi* Storia del mostro di due corpi, p. 100, 8vo. Torino, 1748, (the corpus callosum, septum, fornix, cornua ammonis, pine and plexus choroides were wanting, the medulla oblongata and pons varolii slightly developed.)—*Eller* in Mém. de l'Academie de Berlin, p. 112, 1754, (the brain small, without divisions, pyramids, olives, the appendix cerebri, and several other parts malformed.)—*Klinkosch* Pr. quo anatomen partus capite monstroso proponit. 4to. Prag, 1766, rev. in Diss. med. select. Pragens. Vol. I. No. 12, p. 199, (most of the inner part, and also the first six pairs of nerves are deficient.) *Malacarne* in Mém de la Soc. méd. d'Emulation, Paris, 1803, (in a blind child the optic beds were wanting, together with the eye-balls and optic nerves.)—*Rudolphi* in Abhandl. der Berliner Akademie der Wissenschaften für das Jahr 1814—15, p. 185, Berl. 1815, (with the right eye, the optic bed of the same side was depressed, and lying loosely on the base, and very much malformed.)

(8) In two idiots, the posterior cornua of the lateral ventricles and the pes hippocampi were wholly deficient. v. *Ch. Hastings* in London med. Repos. Jan. and May, 1817.—In rare cases also merely the latter, which I have seen in an epileptic patient; *Wenzel* also speaks of it, De penitiori structura cerebri. The pineal gland is said to have been wanting several times, which is to be ascribed for the most part to its wasting, or even to careless examination. In rare cases, the acervulus cerebri has been missed. The observations on congenital absence of the appendage and valve of the brain are also equally doubtful.

(9) I have once seen, in a double calf monster, merely the tuber annulare and the medulla oblongata existing of the cerebellum; in a double lamb, there was only the anterior thick and rounded part of the medulla oblongata. v. *Barkow* Monstra animalium duplicia. Vol. I. p. 70, 4to. Lips. 1828.—In the Bresl. Mus. No. 3058 and 8226, are the skulls of two lambs, single in front, but double behind; in which, on account of the unsymmetry of the skull, the one posterior half of the brain is much smaller than the other. Sometimes the duplication of the brain is distinguished merely by the increased size of its anterior or posterior extremity. I thus found, in No. 2907, two cerebella and one cerebrum, of which the hinder were twice as thick as the front lobes. If there be but a single cavity in the conjoined skulls of double-headed monsters, the two brains, when they exist, are sometimes partially consolidated, viz. by the two hemispheres in a duck. v. *Tiedemann*, Vol. III. Part I. p. 5, pl. 2, fig. 3 and 4; sometimes they are separate, and only lie beside each other, as in the cases given by *Klein* in *Harles's* Jahrbüchern der deutsch. Medic. und Chir. Nürnb. 1813, Vol. III. Part I. p. 17; by *Barkow* D. de monstris duplicibus verticibus inter se junctis, 4to. Berol. 1821, with plates; and myself in one case, No. 2914 of my Verzeichn.

(10) Viz. the pes hippocampi major and the fimbria double. v. *Sömmerring* Hirn und Nervenlehre, p. 42, note 7.—I have twice found a double commissura mollis of the optic beds.—A double pine. v. *Wenzel*, pl. 4, fig. 2. — A pair of unnatural ganglia between the pons varolii and the pyramids. v. *Tiedemann*, Vol. I. Part I. p. 73. pl. 6, fig. 1.—Brain sand, acervulus, also in animals, viz. in the fallow-deer. v. *Sömmerring* and *Nich. Lisignolo* D. de lapillis vel prope vel intra glandulam pinealem sitis, p. 10. Moguntiæ, 1785.—*Greve* Bruchstücke zur vergleichenden anatomie und physiologie, p. 23, Oldenburgh, 1818; and in a goat, v. *Malacarne* Encefalatomia di alcuni quadrupedi, p. 31. Mantov. 1795.

§ 229.

The brain exhibits remarkable variation in its NORMAL SIZE, both as to SMALLNESS and LARGENESS. There are indeed observed both men and animals, in which the skull and brain are at birth proportionally too SMALL to the body, in consequence of previous imperfect development, or do not become so till after birth, since, in their growth, they do not keep pace with the other parts of the organism. Thus, for instance, we observe in many idiots the whole brain remarkably small.[1] The brain is often generally, though more frequently only locally, very much diminished by external pressure; thus in *hydrocephalus meningeus*, we find, as a congenital state, the brain sometimes exceedingly small, and lying squeezed up in the cavity of the skull;[2] and it is very common, that the brain is compressed and wasted to a greater or less extent by indentations of the skull, by exostosis, by the expansion of the frontal and sphenoidal sinuses, by tumours of various kinds, by thickening of the membranes and collections of lymph, pus, and blood, between the latter, often to a very great extent;[3] even isolated parts, as the pineal gland and the appendage of the brain, are then perhaps totally wasted. Just as frequently is the substance of the brain wasted, if long continued pressure from within operate upon it, as in dropsy of the ventricles and tumours in the brain; indeed, as has been already mentioned

in dropsy of the head, the greatest part of the brain may be in this way destroyed.[4] Although the brain, as well as the other parts of the nervous system, wastes so little in general consumption, it is however generally diminished, both in old age, and also in certain diseases,[5] or more commonly it is atrophic only at particular parts, as in the cerebellum, in isolated and ganglionic parts, as in the striated bodies,[6] the optic beds,[7] the quadrigeminal bodies,[8] the tubercle of the brain, the pineal gland,[9] and the appendage of the brain,[10] &c. We also find it frequently compressed from mechanical influences, viz. violent concussion of the brain.[11] Not less common is the opposite vice, or the IRREGULAR LARGE SIZE of the brain. This is either the consequence of hypertrophy of the organ, or of a more mechanical extension by the fluids contained within it. The former kind is especially produced in rickets, and in rare cases may occur even before birth, so that then the growth of the brain sometimes prevents the formation of the skull, in the same way as in hemicephaly, and the cerebrum covered by its membranes rests upon the base of the skull;[12] sometimes only a part of the brain protrudes through the openings of the skull and forms a hernia cerebri;[13] sometimes, lastly, the brain merely enlarges the otherwise normal skull. Frequently, the rickety hypertrophy of the brain occurs first at birth, and attains often a very great extent;[14] perhaps also brains, which have been much expanded by dropsy in youth, become subsequently, in rare instances of this disease, cured by increased deposition of cerebral substance, and thus retain their morbid size. We therefore sometimes find in adults brains, otherwise normal, possessing an unnatural size and weight.[15] The second kind of enlargement of the brain occurs most frequently, and to the greatest extent, from the collection of water in the cavities of the brain, whereby usually the whole cerebrum, though sometimes also merely certain parts of it, are very much expanded, more rarely and in a less degree by dropsy of the substance of the brain itself,[16] by determination of blood to the brain and by the deposition of other morbid substances, viz. scrofulous matter, &c. In many instances, we observe the size of the brain too large relatively to that of the skull, so that it is compressed within it, and on the removal of the skull-cap, distinctly expands by its elasticity.[17] Sometimes the increase of mass and enlargement is confined to a single part of the brain; this is usually connected with vice of texture, and occurs most commonly in the optic beds, quadrigeminal bodies, the pineal gland, the funnel, and cerebral appendage;[18] sometimes, however, one of

the optic beds, or one of the quadrigeminal bodies, is, though otherwise normal, too large, especially if that on the other side is atrophic.[19]

(1) *Hippocrates* long since considered microcephaly as the cause of idiotcy.—*Willis* Cerebri anatome in Op. omn. p. 14, fig. 4. 4to. Amstel. 1682. — *Roederer* De cerebro observ. p. 5. Gött. 1758.—*Greding* in *Ludwig's* Adversar. Vol. III. p. 549. — *Siebold*, v. Journal f. Geburtshülfe, Vol. I. p. 259—265, and 272—278. *Sandifort* Museum anatomicum, Vol. III. p. 365, No. 443.—Compare the writers on insanity and cretinism mentioned at § 122, note 15—17. —The cerebellum was found small in a cretin, by *V. Malacarne*, Sul gozzi e sulla stupidità che in alcuni paési gli accompagna. Torino, 1789. — I also once found the brain very small in an epileptic person. v. Selt. Beob. Part 1. p. 106. — I think that that form of congenital internal chronic water in the head which *Goelis* describes, p. 27 and 51, in which the skull was small, the sutures and fontanels ossified, the temples too pointed, laterally compressed, &c., belongs here; and that the small quantity of water which is occasionally found in the cavities of the brain was only collected at a later period of life.—I have at least dissected a child of this kind, in which the phenomena, during life, coincided with those mentioned by *Goelis*, but there was no water in the brain. The mere pressure of the too early closed skull upon the brain produces disposition to disease.

(2) *Kaltschmid* De hydrocephalo interno, p. 57, Jenæ, 1752, in *Haller's* Disp. pathol. VII. p. 484.—*Mier* in Samml. auserl. Abhandl. XI. p. 214, (the brain as large as a hen's egg, and as firm as a kidney.)—*Meckel* Anat. phys. Beobachtungen und Untersuchungen, p. 135. Halle, 1822. —*Glover* in *Chapmann's* Philadelphia Journal, Vol. II. No. 1.—I have also seen two cases. Also in hemicephaly, with undistended, untorn, perfect, but depressed brain, hydrops meningeus seems to have existed. v. Monstror. sex anat. et physiol. disquisitio, p. 20.

(3) The pressure comes on so gradually, that it may be very great, without producing paralysis or disturbance of the mind, as I have observed in a case. v. Selt. Beob. PartII. p.85.—Great compression of the brain was observed by *Walther* Salzb. med. chir. Zeitung, 1813, Feb. p. 185, (fungus cranii.) — *Esquirol* in Archives générales de Médecine. Dec. 1823, (medullary sarcom of the temporal region;) and in Dict. des Sc. médicales, Vol. VIII. p. 291, (a fibrous tumour on the clivus.)—*Hesselbach* Beschreibung der pathol. Präparate zu Würzburg, p. 63, No. 642, (fungus cranii, and duræ matris.)—*Ch. Mayo*, in London medical and physical Journal, Vol. LVIII. p. 408, (medullary sarcom in the right temporal region.)—*G. Sandifort* Museum anat. Vol. III. p. 156, No. 127, (fungus cranii.)—*Schindler* in *Rust's* Magazin f. die ges. Heilkunde, 1825, Vol. XXV. Part II. p. 267, (fungus cranii.)—*Lisfranc* in Nouvelle Biblioth. méd. May, 1827, (bloody fungus.) — *Horn's* Archiv f. medic. Erfahrung, 1815, p. 854, (expansion of the frontal and neighbouring sinus.)—*Panizza* in Annotazioni anat. chir. sul fungo midollare dell' occhio. Pavia, 1821. — *Ward* in London medical Repository, Sept. 1823. — *Vingtrinier* in Archives générales de Médecine, May, 1824.—*Neumann* in *Hufeland's* Journal, July, 1824, No. 45, p. 46.

(4) This, however, does not appear to be necessarily the case.—I once saw a case of dropsy of the head examined, in which the bulk of the brain was not in the least diminished. This is also the case with No. 2891 of my Verzeichn. Perhaps the morbid irritation of the brain, which produces the secretion of water, sometimes at first causes an increase of nourishment in the brain.—*Osiander*, Annalen, Vol. I. Part II. p. 59, found the brain of a child, which had water in the head, weighing a pound. — *Breschet* indeed, in *Magendie's* Journ. de Physiol. expérim. Vol. I. No. 1. p. 95, found it decidedly heavier than the healthy brain of a child of the same age.

(5) I have seen this in one case, in idiotcy occurring in later years in consequence of excess. After various fevers and insanity, it is sometimes compressed; *Savaresy* found it diminished in yellow fever, sometimes a sixth of its circumference, v. his work, De la Fièvre jaune, p. 158. Neapel, 1809.—In a diabetic patient. v. *Horn* Archiv f. med. Erfahrung, Vol. XXII.

(6) Viz. *Morgagni*, Epist. IX. 20, XI. 11, LX. 4; in a person affected with convulsions the left was very much wasted. v. *Wenzel* De penitiore cerebri structura, p. 102 and 136. *Biermayer* Mus. Anat. pathol. No. 247; in an idiot I found both very flat. *Marshall's* assertion, that in hemiplegia the corpus striatum of the other side is always diseased, is not verified by experience.

(7) In long-continued blindness of one eye, one of the optic beds is often wasted, and generally that on the opposite, though also on the same side. v. *Sömmerring* in Hessischen Beiträgen, Vol. II. IV., in *Blumenbach's* Medic. Biblioth. II. 2, and *Noethig* D. de decussat. nervor. optic. Mogunt, 1786. *Michaelis* Ueber die Durchkreuzung der Sehnerven. Hallæ, 1790. *Wenzel* De penitiori structura cerebri, p. 115 and 117. *Rudolphi* in Abhandl. der Akadem. der Wissenschaft. zu Berlin, 1814 and 1815, p. 195, in two men, a horse, and an ox. I have twice found the optic beds atrophic on opposite sides, and once both very flat in the previously mentioned idiot. They were found very small by *Ramsay*, Anatomy of the heart, cranium, and brain, p. 45. Edinburgh, 1803. In two insane persons, both the optic beds were found diminished by *Romberg*, 1823, in Zeitschrift für die Anthropologie, by *Nasse*, Part III. p. 214 and 219.

(8) *King* in Philos. Transact. 1686, No. 185, p. 230. *la Peyronie* in Mém. de l'Acad. des Sc. de Paris, p. 208, 1741, (on account of tumour compressing it.) *Blane* s. Auserl. Abhandl. z. Gebr. f. prakt. Aerzte, Vol. XX. p. 564 (from a similar cause.) *Swan*, Dissertation on the treatment of morbid local affections of nerves, Chap. 4. London, 1820, once found in a dog, which had the right foreleg paralytic, the left corpus quadrigeminum remarkably diminished; also in blind persons the corpora quadrigemina participated in the atrophy. *Weber* also found the corpora quadrigemina, together with the cerebellum and pons varolii, smaller on the left side.

(9) *Morgagni*, Epist. VIII. 12, LXIX. 10, LXX. 5. *Wenzel* Ueber den Hirnanhang fallsüchtiger personen, p. 41, 44, 46, 49, 59, 65. Also in blind persons and animals it was sometimes found too small, together with the optic beds.

(10) *Morgagni*, Epist. III. 6, IV. 19, 26, 35, IX. 20, XII. 2, XXV. 10, XXXVII. 30, LVII. 14. *Wenzel*, p. 41, 65, 74, 76. It is frequently seen too small in water of the head.

(11) *Littre* in Mém. de l'Acad. de Paris, 1705, p. 54. *Morgagni* Epist. LI. 9. *Sabatier*, v. *Orfila* Léçons de Médec. légale, 2d edit. Vol. II. p. 447. *Schuhmacher* Medic. chir. Bemerk. p. 392. Kopenhagen, 1808.—*Lorry* Mémoires présentés, Vol. III. p. 365, (in an experiment on a dog.)—*Baumer* in *Posewitz* Journ. f. Medic. Herborn, 1799, Vol. I. No. 2, (in a living person.) I have dissected seven persons killed immediately by falling from scaffolds, but have only seen collapse of the brain in one instance. In no case has it been seen as a certain mark of concussion.

(12) *Hebenstreit* De capitonibus rev. in *Haller's* Coll. Diss. anat. Vol. VI. p. 335, fig. 3.—*Penchienati* in Mém. de Turin, Vol. IV. p. 118. — *de Sidorowicz* D. conspectus rerum medicar. Instituti Vindobon. puerperiis solventium dicati, p. 73, 8vo. Viennæ, 1826, with an engraving, (the calvaria is deficient, the brain very large, unequal in its hemispheres, and contains distinctly water in the left half, as I saw in the Anat. Path. Mus. at Vienna, where the preparation, No. 3744, is;) probably the case observed by *Mende* belongs here, if it be not hydrocephalus encephaloides. v. Nov. Act. Acad. Nat. Cur. Vol. XI. Part II. p. 443, tab. 53, fig. 2.—*Tiedemann*, pl. 8 and 9. It is clear, from comparison of several cases, that this condition may be connected with water in the head, and may run, on the one hand, into hemicephaly, on the other, into hernia cerebri.

(13) Compare § 231.

(14) In a child a year old, the brain was so increased, without loss of substance, that the cavities were diminished, the skull exceedingly expanded, and all the phenomena of water in the head produced. v. *Meckel's* Handbuch der pathol. Anat. Vol. I. p. 298. A similar still stronger case, of a child four years and a half old, is mentioned by *Scoutelen* in Archives générales de Médec. Vol. VII. June.

(15) To wit, four or five pounds in weight, and more. v. *Haller* Elem. Physiol.

Vol. IV. p. 10. — *Sömmerring* Hirn- und Nervenlehre, 2d edit. p. 19, § 24.— *Rudolphi* Physiologie, Vol. II. p. 11.

(16) *Gölis* Von der hitzigen Gehirnhöhlen-Wassersucht, 2d edit. p. 212.

(17) I have twice seen this to such extent, that the elasticity of the brain thrust up the solid calvaria at certain points, by bursting asunder slight fractures; the one case occurred in an epileptic patient, v. my Selt. Beob. Part I. p. 106; the other in a body brought into the anatomical theatre, of which I have no account. — *Fahner's* Beiträge zur prakt. und gerichtl. Arzneikunde. Stendal, 1799. — *Dessessarz*, v. Samml. auserles. Abhandl. und Gebr. f. prakt. Aerzte. Vol. XVIII. p. 99. — *Vering* in *Nasse's* Zeitschrift für die psychische Heilk. 1820. In many cases there seems to arise, in consequence, compression of the brain, and phenomena like those in water of the head. Such were observed by *Cheyne*, *Quin*, and *Warren*. v. above on Water on the Head, § 222; further, *Laennec.*—*Jadelot* in Journ. de Médec. Vol. VI. p. 3. — *Mongenot*, *ib.* Vol. IX. p. 287 and 369.— *Gölis.*—*Scoutelen.*—Similar observations on epileptics are made by *Portal* Observations sur la nature et traitement de l'Epilepsie. 8vo. Paris, 1827. That in apoplexy, the brain often, after the removal of the calvaria, expands, by the congestion of blood in that organ, is well known.

(18) As the accounts of organic disease of the pine, and appendage of the brain, are rarely sufficiently accurate, I shall here give some instances of their enlargement, so that we may be able to refer to them in the following notes. The PINE was found morbidly enlarged by *Drelincourt* in *Mangeti* Theatr. anat. L. IV. c. 2, p. 309, (as big as an egg, and stony.) — *Morgagni*, Epist. I. 14; X. 17; XXI. 24; XXXVII. 30; LIX. 15; LXI. 2; LXII. 15.—*Lieutaud* Hist. anat. méd. L. III. Obs. 177, (as large as a walnut;) 210, (four times too large, and full of pus;) 381, (three times larger than usual.)—*Desportes* Histoire des maladies de St. Domingue, Vol. II. p. 209, Paris, 1770, (as large as an egg.) —*Sömmerring* Addenda to *Baillie's* Morbid Anatomy, p.263, note 561, (sometimes expanded with water.)—*Angeli* Osservaz. med. prat. e chirurg. Imola 793, Vol. I. p. 27, (spongy, stony, filled with yellowish serum.)—*Greding* Sämmtl. medic. Schriften, u. s. w. Vol. I. p. 318.—*Blane*, in Transact. of a Society for the Improvement, &c. London, Vol. II. p. 16, (as large as a nutmeg, and scrofulous.)—*Meckel* D. Archiv f. d. Physiologie, Vol. I. p. 644, with engravings, pl. 5, fig. 4 and 5, (in a child of nine years old, as large as a middling-sized nut.)—Tübinger Blätter, Vol. III. p. 51, (very large, and full of hydatids.)— I have twice seen it as large as a hazel-nut, and hardened by inflammation; in glandered horses it is sometimes swollen. v. *Chabert* Vom Rotz der Pferde im Vollständ. Handb. der Vieharzeneikunst von *Chabert*, *Flandrin* and *Huzard*, Vol. I. p. 370, Berlin, 1798.—The INFUNDIBULUM is seen much expanded in dropsy of the ventricles; in one such case, its canal was so wide in a child as to admit the finger. v. *J. Jeffray* in London medical Repository, 1822, April, p. 275.—Swelling of the APPENDAGE OF THE BRAIN was observed by *Raymond-Vieussens* Novum vasorum corp. human. systema, p. 248, Amstel. 1705.—*de Haen* Ratio Medendi. Vol. VI. cap. 6, p. 271.—*Leveque-Lasource* in *Sédillot's* Journ. gén de Méd. Vol. XXXVII. p. 368.—*Greding*, p. 282.—*Baillie*, Morbid Anatomy, p. 460, 4th. edit. 8vo. London, 1812. — *Chaussier* Procès verbal de la distribution des prix des élèves sages femmes de l'hospice de maternité, 1812, p. 107, (in a new-born child, larger than in an adult.)—*E. Edholm* in Svenska Läkare-Sällskapets Handlingar, Vol. I. Part I. p. 32 and 41.—*Horn's* Archiv f. med. Erfahrung, 1815, Part III. p. 463, (very large, hard, and suppurating within.) — *Oppert* D. de vitiis nervorum organicis, p. 16, Berol. 1815, (very large, and filled with pus.)—*Ward* in London medical Repository, Sept. 1823, Vol. XX. p. 217. — *Rullier* in Archives générales de Médecine, October, 1823, p. 302, (the size of a small hen's egg.)—*P. Rayer* Observations sur les maladies de l'appendice soussphenoidal du cerveau. *ibid.* Nov. p. 350, (an inch and a half in diameter.) — *Neumann* in *Hufeland's* Journal, July, 1824, p. 46, No. 45, (in its stead a large steatom.)—*Abercrombie*, p. 429, (a case of *Powel's*; it was very soft, and five or six times too large;) and p. 430, (a case observed by *Hay*, as big as a walnut.)—Perhaps here also belongs *Pfeuffer's* case in *Henke's* Zeitschrift f. Staatsarzneikunde, 1822, Vol. III. p. 84,

(a large bean-shaped tumour, rising from the Turkish saddle into the brain.)—In the Anat. path. Mus. at Vienna, I saw an instance of great bladder-like expansion of the Turkish saddle, in consequence of induration and hydatid swelling of the appendage of the brain; I have occasionally found the latter swollen, and apparently inflamed. I may here remark, that I have by no means found the appendage diseased and swollen by inflammation in idiopathic epilepsy, as *J. Wenzel* asserts. v. his Beobacht. über den Hirnanhang fallsüchtiger personen, edited by *C. Wenzel*, 4to. Mainz, 1810; in the review of *Wenzel* in the Jenaischen Literat.-Zeitung, I have mentioned this, and subsequently have confirmed it; the same was noticed by *Kelch* Beiträge zur pathol. Anatomie, p. 103.—*Meckel* Handb. der menschlichen Anatomie. Vol. III. p. 600, and *Neumann*, p. 62; it seems also that the morbid state of the appendage in epilepsy is rather accidental, and may be either cause or consequence of this disease.

(19) In diseases of the eye the optic beds are also swollen. v. *Böhmer* Observ. anat. rarior. Halæ, 1766, Obs. 3.—*Ford* in Med. Comm. Vol. I. 1784.—*Serres* found in several idiots the anterior pair of the quadrigeminal bodies more developed than the posterior. v. Anatomie du Cerveau, Vol. II. p. 334, note 1.—*Wenzel*, De penitiori structura cerebri, p. 125 and 126, also saw the cerebral ganglia too large.

§ 230.

The FORM of the brain generally answers to that of the skull, and is therefore as often and as variously irregular as that organ. The cerebrum especially is found malformed; sometimes its length, breadth, or height is generally too great or too small, sometimes it varies only in particular regions. Thus, for example, in idiots the front lobes are usually small and shallow, and both sides of the cerebrum impressed; in rickety persons, on the contrary, the front lobes are often very thick, as the great projection of the forehead already shews; in many cretins the brain is flat and broad; in dropsy of the ventricles the upper part of the cerebrum especially is much expanded, whilst the base of the brain remains tolerably natural-sized, &c. Not unfrequently are the two halves of the brain formed very unsymmetrically, so that the one of them is generally, or only in many of its diameters, very much larger than the other;[1] obliquity of the skull and diseases on one side of the brain often give rise to this. Tumours of very different kinds and size produce deep pits in the upper surface of the brain. Sometimes the brain varies remarkably in reference to its convolutions and plates; one kind of deficient development presents its upper surface completely smooth, or exhibiting only few and flattened elevations;[2] this has been several times observed in idiots, in whom also the number of plates in the cerebellum is very much diminished;[3] the convolutions are frequently destroyed by expansion, especially in dropsy of the ventricles;[4] the opposite proportions also occur, although more rarely, in which the convolutions are small, numerous, and the clefts unusually deep, so that they almost penetrate

into the ventricles.[5] The most remarkable malformation of the brain is the SIMPLICITY of the cerebrum, so that it appears either entire, or divided only at the fore part. Thus we find it in all human and animal monsters with cyclopy, and in those with great and total deficiency of the face, and then in most cases only the fore part of the cerebrum exists, whilst its hinder lobes are either very short or entirely wanting, so that the cerebellum, the quadrigeminal bodies, and even the optic beds, are seen uncovered, and many of the internal parts, as the corpus callosum, the fornix, the septum of the ventricles, and the little commissures of the brain are wanting;[6] usually also dropsy of the brain exists, in the early occurrence of which we may probably seek for the cause of this malformation.[7] We also sometimes find the cerebrum undivided in hemicephaly;[8] hemicephaly connected with cyclopy,[9] and simplicity of the brain also with malformation of the face, viz. wolf's-mouth, which probably is congenitally connected with dropsy of the brain.[10] The cerebrum has, however, been seen undivided without any such malformation.[11] The unnatural simplicity also sometimes occurs in the interior of the brain, thus in rare instances the striated body, the optic bed, is completely united with that of the other side, or the latter unusually connected, to wit, by two commissures, or by the epithelium, which is extended from one to the other. The opposite vice is the absence of the commissures, and the consequent division of the brain.[12] Lastly, we sometimes also find certain little portions of the brain varying from their usual form.

(1) A few remarkable instances have been recently published: *Rudolphi* found in a child which had neither nose nor right eye, the right side of the brain, on which also the four first pairs of nerves were deficient, very imperfect, and different from the left. v. Abhandl. d. Akad. der Wissensch. zu Berlin für die Jahre 1814 and 1815, p. 105, Berlin, 1818, with four engravings.—*M. J. Weber* Specimen malæ conformationis encephali, capitis et pelvis viri, in Nov. Act. Acad. Nat. Cur. Vol. XIV. p. 109, tab. 10—14, (the left hemisphere of the cerebrum is too large, and on the contrary that of the cerebellum much diminished.) In hemicephaly, hernia cerebri and hydrencephalocele, cyclopy and internal water of the head, which are merely similar malformations, we often find a remarkable difference in the form and size of the two hemispheres. In insane persons also, there is often found great unsymmetry of the brain. v. *Greding* Vol. II. p. 525, 595, and Vol. III. p. 453.—*Esquirol* in Dict. des Scienc. médical. Vol. VIII. Art. Demence, p. 289, ff.

(2) I have seen this several times in monsters; it has been found in idiots by *Greding*. v. *Ludwig's* Advers. med. pract. Vol. III. p. 613.—*Jadelot*, in an idiotic child, in a paper read in the Academie de Médecine, Aug. 10, 1824.—Myself, in an idiot of two years old.—Fewer convolutions in idiots. v. *Desmoulins* Anatomie des systêmes nerveux des animaux à vertébres, Vol. II. p. 605, Paris, 1825.—Flattening of the convolutions of the brain in a cretin was seen also by *J. C. Schiffner* in Medic. Jahrbuch d. k. k. Oesterr.-Staats, Vol. VI. Part IV. in undivided brains; in cyclopy especially the convolutions are often entirely, or for the most part, deficient. v. good engravings in *Tiedemann*.

(3) *Malacarne* Neuro-encefalatomia. Pavia, 1791. Compare *Reil's* Archiv. Vol. III. p. 494, (the number of these folds varies from 600 to 700.)

(4) This was first noticed by *Hunauld* in Mém. des Sc. de Paris, 1740, p. 375, and *Morgagni* Epist. XII. 14.

(5) I have seen this a few times, the skull is always very small in such cases; compare my Selt. Beob. Part I. p. 106.—In the Empress Maria Feodorowna of Russia, all the convolutions were very deep, and distinctly separated from each other; v. Medic. chir. Zeitung, 1829, Vol. I. p. 110.

(6) Compare, also, many of the older observations which I have mentioned below on the eye; a few of my own remarks on the brain of cyclops in my Selt. Beob. Part I. p. 49, but especially *Speer* D. de Cyclopia s. unione partium capitis in statu normali disjunctarum. Halæ, 1819. *F. Tiedemann* Beobachtungen über Missbildungen des Gehirns und seiner Nerven in der Zeitschrift für Physiologie von *Fr. Tiedemann, G. R.* and *L. C. Treviranus*, Vol. I. Part I. p. 56—110; and *J. F. Meckel* Ueber die Verschmelzungsbildungen in s. Archiv für Anatomie und Physiologie, 1826, No. II. p. 238. In all the cases of cyclopy which I have examined up to this time, and which will be mentioned in another part, I have found singleness of the cerebrum in men, beasts, and birds, and indeed, in No. 2233, 2234, 2344—2346, 2885—2887, 2974, 2977—2980, 2983, 3045, 3046, 8440, 8738, 8740, 8741, 8744, and 8812 of Bresl. Mus.; and *de la Rue* alone has found the brain properly formed in a cyclops, v. Samml. auserles. Wahrnehmungen, a. d. Arzneikunde, 1763, Vol. VII. p. 295, which is very doubtful.—Also, in cyclopic monsters, connected with deficient eyes, nose, and framework of the upper jaw, simplicity of the cerebrum occurs; such cases were seen by *Klinkosch* Progr. quo anatomen partus capite monstroso proponit, Prag. 1766, and Diss. med. select. Pragens, Vol. I. No. 12. (deficient eyes, nose, and malformation of the mouth.)—*Osiander* Handb. d. Entbindungskunst, Vol. I. Part II. p. 520, (in deficiency of the eyes, nose, and the existence of a trunk;) and, myself, in seven cases, viz. No. 2341, 2888, 2950, 3044, 8021, 8068, and 8297 of Bresl. Mus. The reviewer of *Tiedemann* in the Medic. chir. Zeitung, 1825, No. 47, p. 408, found simplicity of the brain, in an approach to cyclopy; viz. deficient nose, and the existence of a proboscis, together with both eyes; I have also found like circumstances in a monstrous pig, No. 8812.

(7) Compare my Selt. Beob. Part I. p. 49. In all the cases which I have since observed and described, I have found either actual dropsy, or the most distinct traces of it; the cerebrum commonly forms a semilunar body, sloping backwards, between which and the cerebellum, a large watery sac is formed of the arachnoidea and pia mater; on the base of which the large cerebral ganglia, one or both of the quadrigeminal bodies, and the entrance to the single cavity of the cerebrum, are found distinctly filled with water. As this thin sac is usually pretty firmly attached to the skull, it is torn by opening the head, and may therefore often not be observed above the water;—this state, however, is distinctly mentioned in many of the older cases of cyclopy.—*J. F. Meckel* also observed, in several cases, the connexion of dropsy of the ventricles with cyclopy. v. Anat. physiol. Beobacht. und Untersuch. p. 145, and Descriptio Monstror. nonnull. p. 83, 4to. Lips. 1826. In the latter, pl. 5, fig. 2, he has engraved the very rare case of cyclopy in a hydrocephalic embryon of six weeks old.

(8) My Selt. Beob. Part I. p. 12, 37, 49, and since in a few cases.

(9) *Denys* Verhandelingen over het Ampt der Vroed meester. Leyden. p. 198, fig. 7 and 8.—*Lenhossek* in *Harles's* Rhein. Jahrb. Vol. III. Part I. p. 1. A case in the anatom. Mus. Zurich. v. *Meckel* Anat. physiol. Beobachtungen und Untersuchungen, p. 102, and Archiv f. Anatomie u. Physiologie, 1826, No. 2, p. 266.—No. 8742 of Bresl. Mus. is hemicephaly connected with a state bordering on cyclopy, and merely a higher degree of that just mentioned, viz. deficient eyes, and great shortening of the upper jaws.

(10) Three examples are described and engraved by *Tiedemann*, p. 72, tab. 6, fig. 2—5. I consider it extremely fortunate, that out of more than a dozen cases of wolf's-jaw which I have examined with great attention, I have only found in one child, in which however the eyes were at the same time deficient, the brain undivided. v. my Verzeichn. No. 2888; in all the other cases it was

natural, although, as I have here previously remarked, the olfactory nerves are often deficient, and the cleft in a few instances less deep, and the falx very small.

(11) *Bianchi* Storia del monstro di due corpi, p. 100, Turin, 1750, (in a child of seven years.)—Whether the case of *Carlisle*, in Transact. for the Improv. of med. and chir. Knowledge, Vol. II. p. 212, belongs here, or to adhesion of the two hemispheres with wasting of the falx, seems to me doubtful.

(12) Deficiency of the corpus callosum was observed by *Reil*, v. his Archiv für die physiologie, Vol. II. p. 341.—*Meckel* Handbuch der pathol. Anat. Vol. I. p. 301.—*Wenzel*, De penitiori structura cerebri, p. 302, and the review of it in Wiener allgem. Litt. Zeitung, 1813, No. 39, p. 613, (a few times.)—*Cerutti* found merely the posterior part cleft, but describes one case, v. Beschreib. der pathol. Präparate zu Leipzig, 1819, No. 829, p. 206.—It has been already mentioned, that it may be wanting in singleness of the cerebrum, and in severe dropsy of the head, from mechanical causes; a case of the latter kind is described by *Nägele*, in Heidelb. Klin. Annal. Vol. I. Part IV. p. 510. The commissura mollis of the optic beds is often totally wanting, or there is merely a little tubercle in its place, v. *Greding*, Sämmtl. Schriften, Vol. II. p. 322. The cerebellum has also been once seen uncommonly deeply cleft by the falx, v. *Plancus* De monstris, Venet. 1749; and *Kelch* once saw the transverse groove so deep, that the cerebellum seemed to be double. v. Beiträge zur pathol. Anat. No. 43, p. 90.

§ 231.

As the brain is surrounded by the firm skull and almost completely fills up its cavity, so, naturally, are variations in reference to its POSITION, in proportion to that of many other organs, just as rare as that is confined. The vicious position of the brain, therefore, in the interior of the skull, occurs only with simultaneous compression and diminution of the organ, inasmuch as tumours of various kinds sometimes distinctly displace one part of it.[1] The change in the position of the brain frequently arises from its protrusion externally through openings in the skull, which is called RUPTURE OF THE BRAIN, *hernia cerebri, encephalocele.*[2] This may be either congenital or may arise subsequently. The former seems to consist in a morbid partial enlargement of the brain, WATERY RUPTURE OF THE BRAIN, *hydrencephalocele*, which if not in all, is certainly in most cases produced by dropsy of the brain, rather than by a deficient development of the bones of the skull, which is much rather only a consequence of it.[3] According as the aperture in the skull is larger or smaller, and the protruding part of the brain and the collection of water is greater or less, the size and form of the rupture varies.[4] Some forms of the disease gradually run into hemicephaly, as frequently a large portion of the skull is wanting, and the protruding portion of brain is covered only by very thin membrane; in other instances the opening in the skull is but very small, and the swelling, consequently, but small or attached to a narrow neck. So much of the brain is frequently protruded, that but very little more remains in the cavity of the skull, and the skull is, there-

fore, small and flat; in rare cases, particularly if the cerebral rupture be small, the head appears even unnaturally large. Equally various is the seat of the cerebral rupture; in by far the most frequent examples is it found on the back of the head, as the brain is protruded through the enlarged occipital hole, and the cleft upper cervical vertebra, or through a hole in the squamous part of the occipital bone, or, lastly, in the lambdoidal suture;[5] less frequently is the tumour situated on the top of the head, especially at the great fontanel,[6] more rarely on the sides of the skull,[7] on the forehead,[8] or, most rarely of all, it penetrates into the nostrils,[9] the orbits,[10] or the sphenoidal sinuses.[11] The rupture of the brain which is not congenital[12] thus arises: the brain being expanded by its own elasticity, or by increased determination of blood, protrudes through apertures which have been naturally or artificially made in the skull. This kind is proportionally more rare than the congenital, and usually also of much less size.

(1) Large exostoses, fungus of the cerebral membranes, &c., thrust one hemisphere with the falx much to the other side. Medullary sarcom in the orbit which makes its way backwards into the cavity of the skull, and expansion of the frontal sinuses, remove the anterior lobes of the cerebrum so much from their natural situation, that they lie where the middle lobes are naturally found. The hemispheres of the cerebrum were in one case separated by water, four inches from each other, v. Case of hydrocephalus with bifid brain by *Andr. Duncan*, jun., with a description of the malformation, by the late *John Gordon*, in Transact. of the med. chir. Soc. of Edinb. 1824, Vol. I.

(2) *Le Dran* Observat. de Chirurgie, Vol. I. Obs. 1. Paris, 1731, first employed the term ENCEPHALOCELE.—*Ferrand* Mémoires sur l'encephalocele, ou hernie du cerveau, in Mém. de l'Acad. de Chir. Vol. V. Mém. p. 60.—*Guyenot, ib.* Mém. p. 865. — *Corvinus* D. de hernia cerebri. Argentor. 1749, in *Haller's* Coll. Diss. anat. Vol. II. p. 330, with a good engraving.—*la Motte* D. de encephalocele. Paris, 1763.—*Held* D. de hernia cerebri. Giessæ, 1777.—*Salleneuve* D. de hernia cerebri. Argentor. 1781.—*Thiering* D. de hernia cerebri. Gott. 1792.—*le Roy* in Verhandel. van het Genotsch. te Antwerpen. D. III. Bl. 252. — *Meckel* Vom Hirnbruche in Handb. der pathol. Anatomie, Vol. I. p. 301; and in Archiv f. die Physiologie, Vol. VII. p. 139, ff.—*Nägele* Ueber den angeborenen Hirnbruch und die Kopfblutgeschwülste Neugeborener in *Hufeland's* Journal der prakt. Heilk. May, 1822, p. 3.—*Geoffroy* Philosophie anatomique. Paris, 1822, (in several places.)—Single observations are also noticed in *de Plouquet* Repertorium, Art. Cerebri Hernia; and the following writers, *J. van Mekern* Observationes medic. chirurg. Cap. 7. Amstel. 1682. — *Fabricii Hildani* Observ. Cent. VI. Obs. 17, 18.—*Lechel* in Ephem. Acad. Nat. Cur. Dec. II. Ann. II. p. 363. — *Lentin* Observ. med. Fasc. II. p. 71. Cellæ, 1770. — *Jacoby*, v. *Lobstein* and *Beyckert* D. de nervis duræ matris, p. 33. Argentor. 1772. — *Deslandes*, v. Journal de Médec. Vol. XXVI. p. 74. — *Saxtorph* in Collectan. Soc. Med. Havn. Vol. II. p. 280, tab. 5. — *L. E. Schneider* Chirurg. Geschichten. Vol. X. p. 10. Chemnitz, 1785.—*Penada* in Saggio d'Osservazioni e Memorie, Vol. I. p. 15. Padova, 1793. — *Klein* Monstror. quor. descriptio. p. 1. Stuttg. 1795.—*Tenghil* in Medical Facts and Observations, Vol. VII. No. 23.—*Jan. Ruurhof* in Nieuwe Vaterl. Lettercaff. D. I. Part XI. p. 158, with a plate. — *Dessault* auserles. chir. Wahrnehmungen, Vol. VII. p. 26. —*Bang* Abhandlung. über eine Missgeburt, deren Gehirn in einem Beutel auf dem Rücken hing, u.s.w. a. d. Dän. von *Mendel* Copenh. and Leipz. 1801.—*Hull* in Mem. of the Soc. of Manchester, 1802, Vol. V. Part II. p. 495. — *Walter* Museum anat. Berol. 1803, p. 275, No. 1625 and

1626. — *Blumenbach* Geschichte u. Beschreibung der Knochen, 2d edit. p. 124, note c.—*Stein* Geburtshülfl. Wahrnehmungen, Vol. I. p. 346. Marburg, 1807.—*Osiander* in Götting. gelehrt. Anzeiger, 1812, No. 139. Two cases were observed in the year 1813 by *Lallement*, and *Battos* related in *Richerand* Nosographie chirurg. 4th edit. Vol. II. p. 319; and a third in a girl of twenty-two, *Lallement* in Bulletin de la Soc. de Méd. de Paris, Vol. III. p. 351.—*Béclard* in Bulletin de la Faculté de Médec. Vol. III. note g. p. 292.— *Gistrén* in Svenska Läkare-Sällskapets Handlingar, Vol. II. Part I. p. 166, 170, with a plate.—*Kelch* Beiträge zur patholog. Anatomie, p. 95, No. 67.—*Autenrieth* in Tübinger Blättern, Vol. II. p. 273.—*Biermayer* Museum anat. pathol. No. 5, p. 300.—*Busch* Samml. auserl. Beobacht. p. 52, pl. 7. Marb. 1817.—*Seidel* Index Musei anat. Kiliens. 1818, p. 55.—*Earle* in Medico-chir. Transact. Vol. VII. p. 427, (four instances, of which one of *Clarke's;* in the first the puncture was made without injury; in the second death occurred immediately on the incision.—*Palletta* Exercitationes pathologicæ, Vol. I. p. 127, tab. 2. Mediolan. 1820.—Oestreich. medic. Jahrb. Vol. V. Part II. p. 68.—*Textor* in his Neuen Chiron. Vol. I. Part III. p. 469.—*Isenflamm* Anatomische Untersuchungen, p. 131. Erlang. 1822.—*Schnieber* in *Rust's* Magazin f. d. ges. Heilk. Vol. XIII. p. 279.—*Rathke* in *Meckel's* Archiv f. d. Physiol. Vol. VII. p. 481, pl. 5.—*Seerig* D. de hydrencephaloceles specimine eximio, 4to. Vratislaviæ, 1822, with lithogr. plates.—*Goodeve* in *Macleod's* London med. and physical Journal. Vol. L. Sept. 1823.—*Kolbmann* in *v. Siebold's* Journ. f. Geburtshülfe, Vol. IV. Part I. 1823.—*E. Thomson* in London medical Repository, Nov. 1824, (was cured by ligature.)—*Hesselbach* Beschreib. der pathol. Präparate, p. 196. Würzb. 1824. — *Martini* in Ripertorio medico-chirurgico di Torino, No. 59, Nov. 1824. — *Burkart* D. de monstro humano notabili. 8vo. Triburgi, 1825.—*Moschner* Conspectus partuum in Lechodochio Pragensi celebratorum, p. 109. Pragæ, 1826.—*Wedemeyer* in *v. Gräfe* and *v. Walther's* Journ. d. Chir. 1826, Vol. IX. Part I. (in a man eighteen years old.)—*Merye* in Archives gén de Médec. July, 1827.—*Ehrmann* in Répert. gén. d'Anatom. et de Physiol. pathol. Vol. IV. Part I. p. 25.—*Hohl* D. de Microcephalia, 8vo. Halæ, 1827, and in *Niemeyer's* Zeitschr. f. Geburtsh. u. prakt. Medic. 1828, Vol. I. Part I. No. 2.—*Pring* in Edinb. med. and surg. Journ. Vol. IX. p. 14.—*Billard* Traité des Maladies des Enfans nouveaux-nés, &c. 8vo. Paris, 1828.—*J. F. Meckel* has described several cases, viz. one in his Pathol. Anatomie, Vol. I. p. 292; a second and third, in two sisters, in D. Archiv f. d. Physiol. Vol. VII. p. 99, ff; and *ibid.* p. 143; a fourth and, lastly, a fifth in Descriptio monstror. nonnullor. p. 76, in a calf. Up to this time I have examined twelve cases of hernia cerebri, or hydrencephalocele; one in which the hernial sac was adherent to the membranes of the ovum, and described by *Küstner* in Bereicherungen für die Geburtshülfe und für die Physiologie und Parthologie des Weibes und Kindes von *Choulant, Haase, Küstner*, und *Meissner*, Vol. I. p. 35, Leips. 1821.—The second, No. 2929 of my Verzeichn. described by *Seerig*. Three other cases I have mentioned in my Selt. Beob. Part II. p. 157, tab. 3, fig. 3. Compare No. 2928, 2971 and 3088, of my Verzeichn. The other cases are No. 2903, 3087, 8017, 8227, 8365, (calf), 8441, (calf), and 2346 (cyclopic pig.) I have seen several calves in the museums; also *Blueland* Descript. Musei anat. p. 405, No. 2552 and 2543, has described a few such cases. The hernia cerebri approximates to partial dislocation of the brain with large cavities in birds, in which the bony expansion is often imperfectly ossified. Compare above, § 122, note 11, and my Verzeichn. No. 2286 and 2287; and also on ectopy of the brain, an observation of *Geoffroy St. Hilaire*, in Archiv. génér. de Médec. July, 1827, in which he considers the adhesion of intestines lying external to their cavities as the principal cause of monstrosity, whilst really it is always the consequence.

(3) Although, in some cases, perhaps also mere hypertrophy may give rise to hernia of the brain, yet, naturally, dropsy is its cause; therefore, almost all the cases which have been well examined have shewn this: I have also found it as the cause in all the cases which I myself have observed. In the case related by *Penada*, a very considerable quantity of water dribbled from the hernia; and, in that of *Earle*, the water was always reproduced after the hernia was tapped. The great conformity between hernia cerebri and hemicephaly, and its

gradual transition into the latter, their simultaneous existence, v. *Sandifort*, Mus. Anat. pl. 126;—the connexion of hernia cerebri with the dropsy, which I find in No. 2346 of Bresl. Mus. and with large dropsy of the head, as in *Meckel's* first case, and No. 2928, which I observed,—no less support this view. Large dropsies of the head sometimes exhibit several membranous spots, extremely thin and expanded, or actual slits; in which case, external watery bags are formed, similar to those in hernia cerebri, v. § 222, notes 9 and 15. In a few rare instances where the water has escaped, and the brain has seemed to fall together, cicatrices have been found, v. *Meckel*, Descriptio monstr. nonnull. p. 57, and *Billard*. The water is, in rare cases, contained merely between the membranes, which then also merely form the hernia, hydrencephalocele meningea, which *Textor* and *Thomson* have well testified; more frequently the water is found in one or both the cavities, which are very much elongated at a particular spot, which, often, by the extreme thinning of the brain at this part, so that hardly more than the membranes are distinct, renders it very difficult to be distinguished during life; though such thin cerebral sacs, perhaps, will bear the ligature. In rare cases of hydrencephalocele, the water seems to exist simultaneously in the brain and in the membranes, as it does in water of the head. As congenital hernia cerebri always commences before the cranial bones are united, so it is manifest why it is most frequently seated in the membranous interspace of the skull, though, in rare cases, it also penetrates between the ununited bones, when, in consequence of deficient ossification, or absorption from the pressure of dropsy, or of the gid in sheep, holes are produced. I also see that *Dr. E. A. W. Himly*, in his Darstellung des dualismus am normalen u. abnormen menschlichen Körper, u. s. w. Hanover, 1829, thinks he has triumphantly confuted the views put forward in this and the preceding section, relative to the congenital connexion between water on the brain, hemicephaly, cyclopy, and hernia cerebri. This is not the place to controvert the loose statements of the author, and this gentleman will, with the same propriety, get rid of the many observations here collected, which do not well suit his dualism, as easily, by a note of interrogation, as he has already done with one of my observations in this place.

(4) Sometimes it is very large, even larger than all the rest of the head; in some cases also it is divided into two halves, by the less yielding falx and sinus, or by a tendinous band; for example, in *Trew's* case, v. Comment. Nov. 1738, p. 412.—*Thiebault*, v. *Desault* Journ. de Chir. Vol. III. p. 327.—*Penada*, *Béclard*, *Palletta*, and *Kolbmann*, &c. The apparent duplicity of the hernia cerebri is distinguished from the actual which has, in a few cases, been seen; viz. by myself, in its commencement in No. 2771, and its completion in No. 8017, in which it was divided into two halves. — *Martini*, *Ehrmann*, &c.;—in the case of *Billard's* a second hernia cerebri seems to have been produced above the cicatrix.

(5) Of twelve cases, I have found six in which the hernia cerebri occurred on the back of the head, where it has been also seen by *Corvinus*, *Trew*, *van Mekern Fabric. Hildanus*, *Lechel*, *Jacoby*, (in an adult in whom a part of the longitudinal sinus lay in the aperture,) *Deslandes*, *Gardner*, *Tenghil*, *Dessault*, *Bang*, *Hull*, *van der Laar*, *Siebold*, *Merye*, *Penada*, *Klein*, *Blumenbach*, *Gistrèn*, *Lallement*, *Battos*, *Earle* (in four cases,) *Meckel* (in three cases,) *Isenflamm*, *Seidel*, *Rathke*, *Thomson*, *Moschner*, *Burkhardt*, *Kolbmann*. I also saw two beautiful examples at *Carus's*, at Dresden. The cause of this frequency of the hernia cerebri in the occiput is partly, as *Meckel*, Archiv. f. Physiol. Vol. VII. p. 139, has observed, that this region of the head of the embryon of itself juts out, partly that the occipital bone consists of several pieces, which become united only at a late period; and that the water contained in the posterior horn of the ventricle, in the four cavities formed by the processes of the dura mater on the occipital bone, may be operated on by greater power than at other parts, or where it forms rather an inclined plane.

(6) Hernia cerebri verticalis in *Corvinus*. I have met with it here in calves, in two instances, viz. in No. 3088, 8365 (not directly in the middle, but rather to the right side;) further, *Held*, *Schneider*, *Stein*, *Walther*, *Autenrieth*, *Textor*, *Biermayer*, *Hohl*, and *Martini*, &c.; in the latter, there was a hole in both parietal bones. The cases of *Detharding* and *le Dran* seem, as *Nägele* has very properly observed, to belong to bloody tumours.

(7) Hernia cerebri lateralis in *Corvinus*. *Ferrand* in Mém. de l'Acad. de Chir. Vol. XIII. p. 102, (on the lateral fontanel.)—*Béclard* (right temple.)—Oestreich. medic. Jahrb. Vol. V. Part II. p. 68, (between the right parietal and temporal bone,) perhaps the same case which I found in the Anat. path. Mus. at Vienna, No. 3223. *J. F. Meckel*, in the former, (between the mastoid process of the temporal and the articular portion of the occipital,) and the latter (in the right temporal region.) *Billard* (in the left temporal region.)

(8) *Henckel* Samml. medic. u. chir. Anmerkungen, Berl. Vol. VII. p. 50.—Mém. de l'Academ. de Chir. Vol. XV. p. 442.—*Saxtorph*, *Osiander*, *Béclard*, *Kelch*, *Schneiber*, and myself in two cases, v. No. 2928 and 8017. I also saw a similar case in the Anat. path. Mus. at Vienna, No. 1537.

(9) *Lycosthenes* Chronic. XVI. de prodig. et ostentis.—*Richter*, v. Götting. Anzeigen. 1801, p. 441.—Commentat. Soc. Scient. Götting. Vol. XV. p. 81, and in the medic. chir. Bemerkungen, edited by *A. G. Richter*, Chap. 5. Berl. 1813. In *Ehrmann's* case the water projected like a bladder in the region of the deficient nose.—In the Anat. path. Mus. at Vienna I saw a hernia cerebri protruding through the cribriform plate into the nose.

(10) I have observed this in a cyclopic pig, No. 2346 of my Verzeichn. A considerable portion of the brain, covered with dura mater, pressed through an opening in the skull into the single large orbit, and lay there so close to the large eye-ball that there was a flat pit formed for it at the fore part of the latter.

(11) *Klinkosch* Progr. quo anatomen partus capite monstroso proponit, 4to. Prag. 1766, rev. in Diss. med. select. Pragens, Vol. I. No. 12, p. 199. The much expanded cerebral appendage of a dropsical brain, covered with dura mater, penetrated through the body of the sphenoid bone into the nose. Perhaps an indication of it is the case of *Kelch's*, who found the cerebral appendage lying in the sphenoidal sinus, Beiträge zur pathol. Anatomie, No. 7, p. 5; and that of *Béclard's*, who found a considerable aperture in the body of the sphenoid of a child with a large hernia cerebri. I refer here to the cases of cleft of the sphenoid bone which has been sometimes observed in hemicephaly. v. My Selt. Beob. Part I. p. 46.

(12) Compare the surgical collections and manuals; also several cases in *de Plouquet* Repertor. Art. Cerebri hernia.—*Fantoni* Observat. anat. med. p. 172. Venet. 1713.—*Jamieson* in *Ingram*, Practical Cases and Observations on Surgery, p. 85, London, 1751, (seven months after fracture of the bones by whooping-cough).—*Don. Monro* in Medical Transact. London, 1772, Vol. II. p. 353.—*Ferrand* Mémoire sur l'encephalocele in Mém. de l'Acad. de Chir. Vol. V. No. 2, p. 60.—*Le Roy* in Verhandel. van het Genootsch.—te Antwerpen. D. III. p. 252.—Edin. med. and Surgic. Journ. Vol. IX. p. 14, and Vol. XII. p. 22.—*Workman* in the Medical Repository, 1815, Vol. III. No. 18.—*Stanley* in London med. chir. Transact. 1817, Vol. VIII. P. 1, p. 12.—*Turner Thackrah* in *Fothergill's* London medic. and physic. Journ. Vol. XLV. March, (cured by ligature.)—*Jam. Spalding* in the New England Journ. of Med. and Surg. Boston, Jan. 1820, Vol. IX. (cured by repeated excisions.) *J. Lipschitz* D. Encephaloceles acquisitæ cum abscessu cerebri observatio. 8vo. Regiom, 1828. It is vexatious that in several of these and other cases, the observers have not made sufficient distinction between hernia prolapsus and fungus cerebri.

§ 232.

The brain also varies in numerous ways from its regular COLOUR[1]. The brain at its first formation is not divided into grey and white substance; and this state is observed still remaining in new-born children, especially if other deficient development exist. In other instances there is a disproportion of the grey and white substance, so that sometimes the one, sometimes the other predominates. As the blood contained in

the brain very much conduces to its colouring, so must its greater diminution, increase or change, most frequently produce irregular colouring of the brain. Thus we observe in cachectic persons of different kinds, in those who have been mad for a long time, &c., the grey substance of the brain, according to the deficiency of blood, unusually PALE, or more frequently, from the greater quantity of blood, VERY DEEPLY coloured. The latter is naturally very often the case in apoplectic, hanged, drunken persons, &c.; and occurs in a very high degree, as the congested venous blood is sometimes simultaneously very dark, or actually extravasated and mingled with the substance of the brain, in which cases, dark-red, bluish, or purple-coloured spots have been observed both in the cortical and medullary substance. If it be rather arterial blood which is congested in the brain, for instance, in morbid irritation and true inflammation, it is coloured TOO RED either generally or in spots; still, however, the medullary substance, on account of its greater whiteness, is but rarely of a very red colour, but more generally pale or rosy-red, unless there be simultaneous effusion of blood. If, in severe diseases of the brain, the blood be decomposed, or the morbid pigment alone be secreted, the brain not unfrequently appears discoloured in the most various ways, but also in both substances; for instance, pale or dusky-yellow, orange, brown, greyish-green, slate, and even here and there soot-coloured.[2] But it is interesting that in jaundice, the substance of the brain participates rarely or never in the yellow colour of the other organs.[3]

(1) *Morgagni* in many places.—*Billard* in Archives générales de Médecine, Vol. IX. Dec. 1825. — *Lallemand* Recherches Anatomico-pathologiques sur l'Encephale et ses dépendances. 8vo. Paris, 1824—29.

(2) These are the morbid colours which I have myself observed in various shades in men and animals.—I have also occasionally seen, in different vices of texture, although even without these, a deposition of melanotic pigment in defined patches.

(3) *Stoll* Ratio Medendi, Vol. III. Part II., maintains the yellow colour of the brain in jaundice, although it might be merely the membranes and the serum between them, and not the mass of the brain itself. I have never seen the nervous mass of the brain coloured in jaundice; and among the moderns I find no satisfactory case of it.

§ 233.

The CONSISTENCE of the brain is not unfrequently morbidly changed, that is, diminished or increased, and even both states occur simultaneously in different parts. The DIMINUTION OF CONSISTENCE OR SOFTENING OF THE BRAIN, *encephalomalacia*,[1] is observed throughout the brain without suspicion of any chemical change after death, and seems to be then, as in other parts, according to their esssential principle, the consequence

of a not well-understood change of the cohesive power, and of the normal firmness of the organ. It has been found too soft, for instance, often in malignant adynamic fevers,[2] and the various animal epidemics;[3] further, in rickets and tubercular disease of men and animals, in consumption of the lungs, diabetes, and other similar diseases;[4] again, in mental diseases,[5] but especially in dropsy of the brain.[6] We, however, observe more frequently, and also more distinctly, the softening on certain parts of the brain in consequence of true inflammation, both primarily and secondarily, which, for example, occurs frequently around tumours in the brain, or in apoplexy in the neighbourhood of extravasated blood.[7] It is to be observed, that the consistence of the brain is very much diminished in suppuration and gangrene. Not unfrequent is the opposite state, or INDURATION OF THE BRAIN,[8] which equally occurs either generally or partially, and in very different degrees. Long continued or often recurring morbid irritation, certain not satisfactorily understood chemical changes, and various inflammatory states, seem most commonly to produce irregular hardness of the brain. This is often so great, that the brain may be very much handled, without breaking, that it becomes very elastic, and that it then commonly appears more distinctly fibrous than usual; thus it is found not unfrequently in typhus,[9] and especially in chronic and quiet mad persons,[10] in many epileptic persons, cretins,[11] apoplectic patients, and persons long affected with head-ach, &c. Sometimes is the induration, especially the partial, so very great, that it assumes a caseous and callous, and even a cartilaginous hardness.[12] The consistence of the brain is also in rare cases ~~diminished~~ by concussion;[13] also in poisoning with sulphuric acid.[14]

(1) *Rostan* Recherches sur une maladie, encore inconnue, qui a reçu le nom de Ramollissement du Cerveau. Paris, 1820. — *Cruveilhier* La Médecine éclairée par l'anatomie pathologique. Cah. I. Paris, 1821. — *Gendrin* in Annales de l'ecole médicale, July, 1823. — *Lallemand*, first letter, in which he also quotes *Recamier*, *Bayle*, and *Cayol.* — *A. G. Herbst* D. de encophalomalaxia. Halæ, 1825.—*Luzzani* D. de encophalomalacia. 8vo. Monachii, 1826. — *Rostan* Traité élémentaire de Diagnostic, etc. Vol. II. Paris, 1827. — *Guibert* in Revue médicale, March, 1828.—Many observations are found in *Morgagni*, *Home*, &c., and collected by *Burdach*, Vom Baue des Gehirns, Vol. III. p. 534—538, to which many new ones of his own are added.

(2) Viz. *Marc. Ant. Jemina* De febre, anno 1783–84, Monteregali epidemica. v. *Brera's* Sylloge. Vol. X. p. 218 and 247.

(3) *Sagard* Von einer besondern Schaafseuche in den Auserlesenen Beiträgen zur Thierarzneikunde, Part I. p. 94.

(4) To wit in a syphilitic person after violent use of mercury. v. *Wedemeyer* in *Rust's* Magazin f. die ges. Heilk. Vol. IX. Part III. p. 549; in persons who had been long subjected to confinement. v. *Monro*, The morbid Anatomy of the Brain, Vol. I. p. 35 and 160.—I have seen the brain softened in many men and animals, who died of cachexiæ.—*Rodet* once saw the greater part of the brain

softened in a horse. v. Journ. compl. du Dict. des Sciences médicales, Vol. XXIV. p. 39.—*Serres*, the cerebellum in a monkey. v. *Magendie's* Journ. de Physiologie, Vol. II. No. 3, p. 265.

(5) *Greding* in *Ludwig's* Adversar. Vol. II. p. 533, and Vol. III. p. 662. — *Haslam*, Observations on Madness and Melancholy, &c. Cases 4, 10, 18, 26, 28, 30, 37. Lond. 1809. — *Georget* De la Folie, p. 488. Paris, 1820. — *Esquirol* in Dict. des Scienc. médical. Vol. VIII. Art. Demence, (in twenty-nine cases the cerebrum, in seventeen the cerebellum.)—Sometimes in epileptics. v. *Portal* Sur la nature et le traitement de l'Epilepsie. — Sometimes also in cretins.— *Hertwig* found in at least a hundred horses, affected with sleepy staggers, the brain very soft, dirty, yellow, and usually fluids in the ventricles. v. *Hecker's* Liter. Annal. d. ges. Heilk. May, 1826, p. 5.

(6) In dropsy of the ventricles, the septum, fornix, corpus callosum, and the substance of the brain around the ventricles, are often resolved into a kind of jelly or pap; also in the symptomatic water in the ventricles, which occurs in madness, fever, &c. the mass of the brain is too soft. This is not less the case in sheep affected with the gid.

(7) Compare the greater number of writers referred to in note 2, as well as many others cited below, § 235, on apoplexy. In inflammation of the membranes of the brain, we find sometimes merely the outer layer of the brain softened to an inconsiderable depth, and the same within, if the epithelium of the ventricles be inflamed. In animals also, inflammatory softening occurs, especially in mad staggers in the horse.

(8) *Morgagni*, Epist. VIII. 2, et seq. Epist. LXI. 8. — *Meckel* in Mém. de l'Academie de Berlin, 1766, (also found it specifically lighter.) — *Portal* Cours d'Anatomie médicale, Vol. IV. p. 90.—*Pinel*, fils, Recherches d'anatomie pathologique sur l'endurcissement du systême nerveux, Paris, 1822; and Recherches sur les causes physiques de l'aliénation mentale in *Magendie's* Journ. de Physiologie, 1826, No. 1, p. 44.—*Bouillaud* Observations et Reflexions sur l'induration générale de la Substance de Cerveau, considérée comme un des effets de l'encephalite générale aiguë, in Archives générales de Médecine, Paris, 1825, August and September. Many individual cases are collected by *Burdach*, p. 538, ff. I have seen also a few very remarkable instances, v. Selt. Beob. Part II. p. 93, on the infundibulum, and more recently in a woman who died of tetanus, with preceding fixed pain in the head. Some examples of great partial hardening may be found in Ephem. Acad. Nat. Cur. Dec. III. Ann. IV. p. 148, (in the cerebellum.)—*Morgagni* Epist. IX. 25, (the anterior lobe of the right hemisphere.)—*Pyl* Aufsätze u. Beobachtungen a. d. gerichtl. Arzneiwissenschaft. Vol. VII. p. 89, (two-thirds of the right hemisphere.)—*Portal* Observations sur la nature et le traitement de l'Apoplexie, p. 144, Paris, 1811.—*Meckel* D. Archiv f. Physiologie, Vol. I. Part I. p. 644, (hardening, swelling of the pine.)—*Howship's* Practical Observations in surgery and morbid anatomy, Cases 31 and 32, (the cerebrum.)—*Castellier* in Journ. de Méd. Chir. et Pharm. May, 1815, (cartilaginous in the cerebellum, accompanied with a hole in the occipital bone.) — *Hutchinson*, v. *Horn's* Archiv 1821, Part I. p. 376, (a hardened spot in the left hemisphere.)—*Monro*, (in the anterior lobe of the left hemisphere, and adhering to the dura mater.) — *Bergmann*, v. *Nasse's* Zeitschrift für Anthropologie, p. 415, 2 parts, (both optic beds, in a paralytic and squinting child.)—*Wedemeyer* in *Rust's* Magazin f. d. ges. Heilk. Vol. XIX. Part II. p. 227.—*Lallemand*, 2d letter, p. 285, case 30, (a part of the left hemisphere as hard as cheese.)—*Heusinger* in Zeitschrift für organ. physik. April, 1828, Vol. II. Part IV. p. 382, (the valve of the brain cartilaginous, with a layer of fat upon it.)—*Abercrombie*, 2d edit. case 18 (the corpora olivaria, the crus cerebelli, and the tubercula mamillaria cartilaginous,) and p. 446.—A case of *Anderson's*, p. 453, from Medical Repository, Vol. III. (hardening of the cerebellum.) Hardening of the infundibulum is described by *G. Sandifort* in Museum anat. Vol. III. p. 148, No. 40.

(9) *Stoll* Ratio Medendi, Vol. I. p. 185.—*Chambon de Montaux* Observ. clin. Paris, 1789, Obs. 29. — *Rudolphi* Physiologie, Vol. I. p. 93, (indeed in thirty bodies from typhus.) In the epidemic typhus of the years 1809 and 1812-13,

I dissected a great number of bodies which had died of that disease, and found hardening of the brain, especially in those which died within the first week; in many of those which died at a later period, I found great softening. I do not know whether this is constant. Compare also *Gaudet* Recherches sur l'endurcissement général de l'encephale, considéré comme une des causes materielles des fièvres dites ataxiques. Paris, 1825.

(10) *Morgagni*, Epist. anat. med. VIII. 4—18.—*Greding* in *Ludwig's* Adversaria, Vol. II. p. 533.—*Hunter* and *Baillie*, Morbid anatomy, p. 443.—*Sömmerring's* Addend. to *ib.*—*Plenciz* Acta et Observata medica. Prag, 1733, (in a melancholic person.)—*Loder* in *Bucholz's* Beiträgen zur gerichtlichen Arzneigelahrtheit, Weimar, 1790, Vol. III. p. 237, (in an idiot.)—*Pyl* Aufsätze u. Beobachtungen aus der gerichtl. Arzneiw. Vol. VII. No. 10, (in an idiot.) — *Haslam* (out of thirty-seven insane persons, in nine.)—*Marshall* (of twenty-two, in sixteen cases.) — *Romberg* in *Horn's* Archiv. 1823, Part I. (in several cases.) — *Neumann* in *Hufeland's* Journ. July, 1824, p. 59, (in seven cases.) — *Bleuland* Descriptio Musei anatomici. Traj. ad Rh. 4to. 1826, p. 200, No. 997, (in a maniac of sixty years the brain was discoloured, very hard and dry, and apparently without blood-vessels.)—*Esquirol*, (in many cases.)—*Pinel*, in *Magendie's* Journ. de Physiol. 1826, No. I. p. 80, says, that in chronic and incurable insanity, the brain becomes very hard and fibrous, and the grey substance at the same time very pale; I have found this a few times very remarkably in epileptic persons; *Portal* also sometimes found it hardened; in acute epilepsy this is said to be always the case. v. *Joseph Adams*, in Transact. of the Medic. Soc. of London. 1817, Vol. I. Part II. No. 1.

(11) *Foderé* Traité du Goître et Crétinisme, &c. Paris, Ann. VIII. It is, however, by no means constant, as he thinks.

(12) That it has been seen quite dry and crumbling, is indeed either from confusion with ossification, or it is an exaggeration. What the ancients called scirrhus, belongs, for the most part, either here or to scrofulous deposition in the brain.—In two cases I have found the brain very hard, indeed almost all the small vessels of the brain ossified and stuck into it like pins; one of these cases is related in my Selt. Beob. Part II. No. 39, p. 93.

(13) *Boyer* Traité des Maladies Chirurgicales, Vol. V. chap. 1.

(14) *Willudovius* found the whole surface of the brain as hard as coagulated albumen several lines deep, communicated by *Remer* in *Hufeland's* Journal, Sept. 1819, p. 61.—I have since had the opportunity of examining a similar case, in which, though the hardening was somewhat less, it was still merely external, as a proof of the permeability of the membranes; the smell also in opening the skull was sour. I take this opportunity of mentioning that I have several times perceived a strong smell of medicine in opening the skull; in three instances in which death was produced by drinking brandy, the brain smelt strongly of spirits, but in one instance only it appeared to me to be too firm. The smell of spirits was, in one instance, found in no other part of the body, but only in the cavities of the brain. v. *Bust's* Magazin f. d. ges. Heilk. 1827, Vol. XXV. Part I. p. 125.

§ 234.

The CONTINUITY of the brain may be, as is well known, destroyed in various ways by SWORD, STAB, SHOT WOUNDS, and CONTUSIONS; and sometimes the instrument inflicting the injury, sometimes the compressed and splintered portions of the skull penetrate into it. Often indeed is a not inconsiderable LOSS OF SUBSTANCE borne without loss of life, and even of the usual functions of this organ.[1] It is interesting, that contusions and actual TEARING[2] of the brain sometimes occur, in consequence of injuries of the head which do not penetrate, but merely jar the head, and that these are found not only

on the part which is struck, but also in parts which are distant and opposite.[3] Such tearings and divisions of the substance of the brain occur not unfrequently in apoplectic persons, from the effusion of blood. Large collections of water in the ventricles also give rise to tearing of the septum of the ventricles, the fornix, &c.; indeed a dropsical brain may even burst on one side and discharge its water.[4] If the wounds of the brain are mere cut-and-thrust wounds, they are often HEALED BY ADHESION; but if they are connected with loss of substance, they are healed by GRANULATION, by which the previously lost substance is gradually restored.[5] If the granulations be too great and luxuriant, the morbid mass protrudes through the aperture in the skull, and forms the so-called FUNGUS OF THE BRAIN, *fungus cerebri.*[6]

(1) Compare the works on Injuries of the Head and the Surgical Writers especially.—*Yonge* Wounds of the Brain proved curable, 12mo. London, 1682.—*Behrens* De vulnere cerebri non semper et absolute lethali. Francof. 1733.—*Teubeler* praes. de *Büchner* D. de vulneribus cerebri non semper et absolute lethalibus. Halæ, 1750.—*Hennequin* D. sur les lésions traumatiques du cerveau in Diss. souten. à l'Ecole de Méd. de Paris, An. VII. et VIII. No. 7.—*C. G. Spiessbach* D. de singularibus quibusdam cerebri cordisque vulneribus. Vratisl. 1812.—*Copland Hutchinson*, Practical Observations in Surgery, London, 1826, Treatise 4. — *B. Brodie* in Medico-chir. Transact. Vol. XIV. London, 1828. — Many cases have been collected by *Burdach* vom Baue und Leben des Gehirns, Vol. III. p. 501, ff. Compare *Arnemann* Versuche über das Gehirn und Rückenmark. Gött. 1787.

(2) *Zittmann* Medicina forensis. Cent. V. case 33. Francof. 1706.—*Wilmers*, v. *Richter's* Chirurg. Biblioth. Vol. V. Part IV.—*Henkel* Medecin. u. chirurg. Beobacht. Berl. 1779. Obs. 66. — *Ollenrodt* in *Arnemann's* Magazin f. die Wundarzneiwissenschaft. Vol. I. Part II. p. 119. — *Bernt* Beiträge zur gerichtl. Arzneikunde, Vol. IV. p. 237, (they are said also to occur in epilepsy.) — *A. Cooper*, Lectures on Surgery, edited by *Tyrrel*, Vol. I. p. 263.

(3) This, for satisfactory reasons, is much more rare than on the skull.

(4) Compare above, § 222, § 228, and § 231, note 3.—I made one very rare observation in a child, with large dropsy of the head, and other malformation. v. my Verzeichn. No. 2891; both ventricles were very much expanded with water, but especially the left; and the posterior lobe of the brain, on that side, has, at its outermost extremity, an aperture, nearly three lines in diameter, roundish, flat, lined with pia mater, passing into the cavity of the ventricle. The origin of this was a little hard encysted tumour of the arachnoid, lying loosely in it, which, moving close over the aperture, had prevented the escape of the water. The brain is No. 8814 of Bresl. Mus.

(5) The loss of substance in the brain, however, in rare cases, is healed without reproduction, especially if the penetrating piece of bone remain and occupy the place of the depressed brain.

(6) *Sand* and *Stolz* D. de fungo Cerebri. Regiom. 1700; rev. in *Haller's* Coll. Disp. chir. Vol. I. No. 9.—*Conrad* D. de hydrocephalo cum fungo cerebelli. Argent. 1778.—*C. D. Windel* D. de fungo cerebri et duræ matris. 4to. Goett. 1809.—Many cases are collected in *de Plouquet's* Repertor. Art. Cerebri fungus; and in *Burdach*, p. 550.—Compare the works on Surgery.—There is an interesting case described in Lond. med. and physical Journ. p. 369.

§ 235.

Among the VICES OF TEXTURE in the brain, which occur more commonly perhaps on the right side than on the left, and in hemiplegic persons are found generally on the opposite side to the palsy, INFLAMMATION OF THE BRAIN, *encephalitis*,[1] and the IRRITATIVE and APOPLECTIC CHANGES, so likely to be confused with it, deserve the first mention, both on account of their activity and importance. This is partly consequent on external mechanical causes, as actual wounds, contusion and concussion of the brain, partly from internal causes, and may be either an idiopathic and secondary disease, as in many fevers, eruptive diseases, diseases of the ears, and organic vices of the brain, viz. extravasated blood, tubercles and tumours of various kinds. Rarely or never is the whole brain, but usually only a part of it, affected, and the disease is seated either in the vascular membrane which covers the surface or lines the cavities of the brain, as well as in the layer of brain immediately beneath,[2] or in the cortical substance, or lastly, in the larger collections of medullary matter and the interior more important parts of the brain. A more or less deep red colour of the substance of the brain extending generally throughout it, or streaky and spotty, originating not merely in congestion of certain vessels, but also affecting the whole mass in the diseased parts; certain intense red spots, which depend on the effusion of little portions of blood, and changes of consistence distinctly morbid, as well as of the neighbouring cerebral substance,[3] characterize inflammation in this organ. Similar, although decidedly different, is the condition of the brain in the MORBID IRRITATION which often accompanies ardent fevers, especially typhus,[4] acute eruptive diseases,[5] nostalgia,[6] epilepsy,[7] drunken-madness,[8] tetanus,[9] convulsions, hydrophobia, softening of the stomach,[10] painter's colic,[11] &c.,[12] perhaps even first occurs in the agony of death; here also turgescence is seen, and great and often bright red injection of the brain, but not the general red colouring, the spot-like effusion of blood, and the change of consistence.[13] In SANGUINEOUS APOPLEXY, *apoplexia sanguinea*,[14] as it occurs spontaneously in fevers attended with coma, in injuries of the head, in cases of suffocation, &c., we find either, in rare cases, a stagnation of the blood produced from mere congestion, in some parts or in the whole of the venous system of the brain, which exhibits itself even in the external examination of the brain, as well as in transverse sections by the spouting out of the blood at distinct points;[15] or usually with simultaneous great vascularity of the brain, an actual EX-

TRAVASATION OF BLOOD at certain parts. This may be trifling or very considerable, fluid or coagulated, and sometimes between the membranes, sometimes under the vascular coat on the surface of the brain, sometimes in the ventricles,[16] and sometimes, lastly, which is the most common, in the substance of the brain itself. In the latter case the extravasated blood is occasionally mingled with the substance of the brain,[17] so that it appears as it were drenched in blood, or more commonly the blood is effused in particular cavities,[18] which are sometimes connected with the cavities or surface of the brain by means of tears. These extravasations of blood in the substance of the brain occur most frequently in the striated bodies and in the hemispheres of the cerebrum, much less frequently in the cerebellum and in the oblong marrow.[19] The effusion of blood naturally takes place from the smallest vessels of the cerebral substance, and those cases are but rare, and mostly originating in mechanical influence, when the large vessels of the membranes, of the plexuses, or of the brain itself, have produced effusion of blood by their rupture.[20] If the apoplectic attack have not been soon fatal, the effusion of blood between the membranes or into the cavities, if it be not great, is either absorbed, or, irritating the brain like an extraneous body, operates on it and produces various changes, as inflammation of the neighbouring cerebral substance, greater or less, or even pap-like softening of the surrounding parts, yellowish, brownish, and more or less red colouring of the adjacent substance of the brain. Lastly, also, a false membrane is often formed by inflammatory exudation, which surrounds the extravasated blood like a bag or capsule.[21] In the latter case, in which there is a disposition to cure, a serum is secreted from the newly-produced sac, by which the blood being thinned and rendered looser, its absorption is forwarded, and either a true cicatrix of the diseased part of the brain ensues, or a little cavity remains, of which the walls are connected by fibres of loose plastic lymph, and in which is found a little hard coagulum of discoloured cruor, fibrous matter, coagulated albumen, or nothing more than a little watery secretion.

(1) *Fischer* D. de cerebri ejusque membranarum inflammatione et suppuratione occulta, 1781.—*van der Belen* D. de cerebri ejusque membranarum inflammatione et suppurat. occulta. Lovan. 1784.—*Noelken* D. de cephalitide. Erford, 1798.—*Constantin* D. de Encephalitide. Lips. 1800. — *Haartmann* D. Encephalitidis diagnosi. Abo. 1802. — *Pontin* in Vettenskaps. Jurn. för Läkare och Fältskärer, Vol. I. Part II. p. 7, Stockholm, 1807. — *Thom* D. de encephalitide. Giessæ, 1810.—*Ducrot* Essai sur la cephalite ou inflammation du cerveau. 4to. Paris, 1812.—*Malin* D. de encephalitide. 8vo. Halæ, 1817.—*V. Furtner* D. de variis Encephalitides speciebus. 8vo. Landishuti, 1818. — *Bleynie* Sur l'inflammation du cerveau. Paris, 1819.—*J. H. Alleyne* D. de inflammatione longa cerebri.

Edinb. 1822.—*Bouillaud* Traité clinique et physiologique de l'encéphalite, ou inflammation du cerveau et de ses suites, telles que le ramollissement, la suppuration, les absces, les tubercules, le squirre, le cancer, etc. 8vo. Paris, 1825.—*C. F. Bellingeri* Storia delle Encefalitidi, che furono epidemiche in Torino nell' anno 1824. Torino, 1825.—*Itard* Memoire sur les phlegmasies cérébrales in Mém. de l'Acad. de Médec. de Paris, Vol. I. No. 4. 1828.—On inflammation of the brain in cattle, v. Archiv f. Thierheilk, Vol. IV. Part I. Zurich, 1828. — On secondary inflammation of the brain, arising from diseases of the ear, v. *Lallemand*, Vol. II. p. 233, ff.—*Abercrombie* and *Itard* Traité des Maladies de l'oreille. — Upon the inflammatory state of the appendage of the brain, v. *Wenzel* Ueber den Hirnanhang fallsüchtiger Personen. Mainz, 1810.

(2) Compare § 221.

(3) Especially softening, which, if I be not mistaken, was first remarked by *Vetter*, in his Aphorismen aus der pathol. Anatomie, p. 31, § 21.

(4) Several of the older writers held inflammation of the brain as the proximate cause of typhus fever, viz. *Willis*, *Chirac*, *Werlhof*, *Silva*, *Fracassini*, *Marteau de Grandvilliers*, in Journ. de Médec. 1758, Vol. VIII. p. 275. — *Donald Monro*; more recently, *Reil*, *de Plouquet* Expositio Nosologica Typhi. Tübingen, 1800.—*Constantin*, but especially *Marcus*, in Ephemeriden der Heilkunde, Vol. I. p. 1. Bamberg, 1811, and *ibid.* in *Röschlaub* Ueber den Typhus. Bamberg, 1814.—*H. Clutterbuck*, An inquiry into the seat and nature of fever, 2d edit. London, 1825, and the modern French School have supported this view more or less. The cause of malignant intermittent fever has also been sought for in inflammation of the brain, viz. *Forti*, Therapeutice speciales ad febres perniciosas, 4to. Francof. et Lipsiæ, 1756.—*Comparetti*, Riscontri medici delle febbri larvate, periodiche, perniciose, Padua, 1795, and *Itard*. Opposed to this opinion very properly are many, viz. *Ludwig*, Adversaria medico-practica, Vol. I. Part 1. p. 188.—*Hufeland* and *Himly*, Biblioth. der prakt. Heilk. July, 1812, p. 45.—*Horn*, Archiv f. medicin. Erfahrung. September, 1812, p. 296; March and April, 1813, p. 317.—*Friedreich*, Werth der Leichenöffnungen zur Bestimmung Typhus sey Hirnentzündung. Würzb. 1814.

(5) In small-pox, measles, scarlet-fever, &c., also in sheep-pox, v. *Hurtrel d'Arboval*, Traité de la clavelée, etc. Paris, 1822.

(6) *Larrey*, Recueil de Mémoires de Chirurgie. Paris, 1821.

(7) *Portal.*

(8) *J. Frank*, *Nasse*, *Abercrombie*, also *Sutton*, on Delirium tremens.—*Lind* De delirio tremente sic dicto observationum series; cum epicrisi de morbi indole ac natura. Copenh. 1823.—*Rob. Macnish*, The anatomy of drunkenness. Glasgow, 1827.—*Barkhausen*, Beobachtungen über den Säuferwahnsinn, oder das Delirium tremens. Bremen, 1828.

(9) *Speranza*, in Anno clinico-medico. Parma, 1823-4.—*E. Blasius*, Ueber den Leichenbefund bei am Tetanus Verstorbenen, in *Rust's* Magazin f. die ges. Heilk. 1828. Vol. XXVII. Part I. p. 53.

(10) *Camerer*, Vers. über die Natur der krankhaft. Magenerweichung. Stuttg. 1828.

(11) *Benj. Palais*, Traité pratique sur la colique metallique, etc. Paris, 1825. —*Renauldin*, in Journ. compl. du Dict. des Sc. médical. Vol. XXII. p. 297.

(12) According to *Faneau-Delacour*, as consequent on castration of fowls and sheep. v. Journ. univ. des Scienc. médical. June, 1824.

(13) But indeed this distinction applies only generally to the just mentioned diseases, in which, in some cases, there is complication of different kinds, and a gradual transition to true inflammation.

(14) Also hæmorrhagia cerebri, apoplexia cerebralis, &c. As to the writers on this subject, compare *Reuss* Repertor. Vol. XII. p. 56.—*de Plouquet* Repertorium, and *Burdach*, Vol. III. p. 506, ff.—*Wepfer* Observationes anat. ex cadaveribus eorum, quos sustulit apoplexia; nov. edit. access. Auctuarium historiarum et observationum similium. Scaphus, 1675, and Observat. med. pract. de affectibus capitis internis et externis. Scaphus, 1727.—*Morgagni*, Epist. II., III., and LX.—*J. G. Walter* Von den Krankheiten des Bauchfells und dem Schlagfluss, 4to. Berl. 1785.—*B. Chandler*, An inquiry into the various theories and methods

of cure in Apoplexies and Palsies. 8vo. Cant. 1785.—*Zuliani*, De apoplexia præsertim nervea commentarius. 8vo. Lipsiæ, 1790.—*Kirkland* a Commentary on apoplectic and paralytic Affections. London, 1791.—*Burdach* Die Lehre v. Schlagfluss u. s. w. Leipz. 1806.—*Sander* D. de Apoplexia. Goett. 1807.—*De de la Vauterie* D. sur l'Apoplexie, considérée specialement comme l'effet d'une phlegmasie de la substance cérébrale. Paris, 1807.—*Foderé*, De apoplexia disquisitio. Avenione, 1808.—*Portal* Observations sur la nature et le traitement de l'apoplexie et sur les moyens de la prévenir. Paris, 1811.—*Montain* Traité de l'apoplexie. Paris, 1811.—*Cheyne*, Cases of Apoplexy and Lethargy, with Observations upon the comatose Diseases. Lond. 1812.—*Riobé* Observations propres à resoudre cette question: L'Apoplexie dans laquelle il se fait un épanchement de sang dans le cerveau, est elle susceptible de guerison? Paris, 1814.—*Rochoux* Recherches sur l'apoplexie. Paris, 1814.—*Hopf* Versuch eines Umrisses der Hauptgattungen des Schlagflusses und ihrer Behandlung. Stuttg. 1817.—*Leune* De Apoplexia. 8vo. Lips. 1817.—*Serres* Nouvelle division des Apoplexies in Annuaire med. chir. des Hôpitaux et Hospices civiles de Paris. 4to. 1817.—*Bricheteau* in Journ. compl. du Dict. des Scienc. médic. July, 1819. Vol. I. p. 129—152, and 289—317.—*Moulin* Traité de l'Apoplexie, ou Hemorrhagie cérébrale, etc. Paris, 1819.—*Richelmi* Versuch einer. Abhandl. üb. die Apoplexie u. s. w. a. d. Fr. von *E. A. Gräfe*. Berl. 1821.—*Romberg* in *Horn's* Archiv, 1823. I.—*Tacheron* Recherches anatomico-pathologiques, Vol. III. p. 386—485.—*Mertzdorf* in *Rust's* Magazine, Vol. XIV. Part II.—*J. Carson* on the circulation of the blood in the head, in Edinb. med. and surg. Journ. No. 79, p. 258, April, 1824.—*Lallemand* Recherches Anatomico-pathologiques sur l'Encephale, &c. 8vo. Paris. 1824-29.—*Beck* Ueber den ursprünglichen Hirnmangel und üb. die Pathologie u. Therapie des Gehirnblutflusses. Nürnb. 1826.—*L. F. Bravais* in Revue médic. franç. et étrangère, Vol. I. and II. 1827.—More recently, at Edinburgh, have appeared Dissertations on Apoplexia sanguinea, by *J. Barclay*, 1805, *Sainsbury*, 1809, *Prendergast*, 1812, *Hannay*, 1812, *A. Hunter*, 1813, *Miln*, 1814, *Bagrie*, 1815, *Goring*, 1816, *Burnie*, 1818, *Ballingall*, 1819, *Annan*, 1820, *Walsh*, 1820, *F. Travers*, 1822, *M. Baillie*, 1823.

(15) *Morgagni*, Epist. X. 17, 18.

(16) In these cases the vessels of the plexus choroides are usually burst, v. *Morgagni*, Epist. II. 9, 11, 15, 22; Epist. III. 11; Epist. LXII. 7; or the blood extends from the neighbouring cavities filled with blood into the ventricles, by canals and clefts: here we sometimes find so large a quantity of blood collected, that the ventricle is very much expanded, or the septum, the fornix, &c., burst. According to *Morgagni*, these extravasations occur more frequently on the right than on the left side; perhaps the flow of blood is stronger there, for which reason, as has been already mentioned, vices of other kinds are said to be more common on the right side.

(17) *Morgagni*, Epist. V. 6, 7.—*Lallemand*, Letter I.

(18) *Wepfer* and *Morgagni* were acquainted with these and their canals into the ventricles, or up to the surface of the brain. Compare *Morgagni*, Epist. III. 7, 9.

(19) Several cases of extravasation into the cerebellum are described by *Serres* Recherches sur les maladies organiques du cervelet in *Magendie's* Journal de Physiologie, Vol. II. No. 2, p. 172; No. III. p. 249.—I have up to the present time, among the great number of apoplectic cases which I have examined, found but twice extravasation in the cerebellum; the one case I have described in my Selt. Beob. Part II. p. 97.

(20) That diminished elasticity which the otherwise thin cerebral arteries exhibit in disease and old age produces a disposition to tearing, and consequent extravasation of blood, is well known; and more recently *Bouillaud*, in Mém. de la Société Médec. d'Emulation de Paris, Vol. IX. No. 5, 1826, has described a chronic inflammation of the cerebral vessels as a common cause of apoplexy; but this is merely a preparatory cause, and many mortal effusions from blows occur without any morbid condition of the arteries of the brain, as frequently as that occurs without any apoplexy. A peculiar congestion of blood in the brain, which in many cases terminates in effusion of water, in other cases in extravasation of

blood, or even in both, appears to be the principal cause. It is interesting, however, that hypertrophy of the left heart, without narrowing of the aorta, as I have three times observed, gives rise to apoplexy.—*Legallois* in Bulletin de la Fac. de Médec. de Paris. Ann. XIII. p. 69.—*Bricheteau*, p. 17.—*Lallemand*, Vol. I. p. 43, 91, &c.—Bursting of aneurysms of the cerebral and meningeal arteries, (v. above, § 196, note 7; and *Serres* in Archiv. gén. de Méd. Vol. XI. March, 1826; and in *Magendie's* Journal de Physiol. Vol. VI. p. 82, No. 1,) or of the sinuses of the brain, (v. above, § 206,) give rise to effusion of blood into the cavity of the skull. Perhaps stoppage of the sinuses by fibrous matter or suppuration, which has in a few instances been seen, may be enumerated among the causes of their bursting.

(21) *Cheyne* considers this as a false membrane surrounding the extravasated blood; but *Riobe* was the true discoverer. Compare farther *Rochoux*, *Raisin* Sur les kystes apoplectiques, in the Journ. gén. de Méd. 1820, and *Cruveilheir* Essai sur l'Anatomie pathologique, Vol. I. p. 204.—*Lobstein*, Compte rendu sur les travaux anatomiques, p. 51, confirms it, as I can also from several of my own observations.

§ 236.

Not unfrequently we observe, consequent upon preceding inflammation of the brain, SUPPURATION of this organ,[1] either as a primary or secondary affection. The former commonly occurs partly from internal causes, and from all those which could originate in a primary inflammation of the brain, but especially often in certain scrofulous dispositions; partly from external mischief, as concussion and actual wounds of the brain.[2] Secondary suppuration, however, is found in rare cases in acute fevers, in extravasation of blood, inflamed tumours of the brain, and caries of the skull; most frequently, however, in consequence of inflammatory and suppurative diseases of the ear.[3] The hemispheres of the cerebrum are most usually the seat of suppuration, although it may be also observed in most other parts of the brain. In all these cases, the suppuration appears, either as an open, more or less broad, ULCER penetrating the outer or inner surface of the organ, or hidden in the interior of the cerebral substance itself. In the latter instance, we perceive the pus sometimes poured out in the substance of the brain, and mingled with it, sometimes in several spots simultaneously, which are more extensive and run together, sometimes, lastly, collected into one or several abscesses. The grey substance with which the pus mingles appears pale and yellowish, the white substance more distinctly yellow, or yellowish-green, and almost always more or less softened; so also do the parts surrounding the abscesses become naturally softened, injected, and discoloured in various ways; not unfrequently by the inflammatory exudation, is produced a tolerably firm cyst around the collected pus, a TRUE ENCYSTED ABSCESS, which, however, in other cases appears to arise from suppuration of an isolated tumour. In rare cases, abscesses of the brain discharge their pus by bursting or by fistulous

openings into the cavities of the brain, on its surface, and still further, externally by natural or carious apertures in the skull, into the nose, the ears,[4] &c.

(1) *Camerarius* D. de vomica cerebri. Tüb. 1711.—*Bianchi* Storia medica d'un apostema nel lobo destro del cerebello. Rimini, 1751.—*J. Plancus* Storia medica d'un apostema nel cerebello. Rimini, 1752.—*Nebel* Pr. de abscessibus cerebri a causa externa ortis. Heidelb. 1790.—Edinb. med. and surg. Journ. Vol. XVIII. p. 505; many single cases are found in *Bonetus, Morgagni, Lieutaud,* in *de Plouquet's* Repertor., *Reuss* Repertor. Comment. Vol. XII. p. 78; Vol. XV. p. 107; in *Home.—Powell* in Transact. of the College of Physicians, Vol. V. p. 198.—*Burdach,* Vol. III. p. 520—528.—*Lallemand,* Letters 2, 3 and 4;—in *Abercrombie* and in *Hooper.*—A few instances are related in *Horn's* Archiv f. medic. Erfahrung. 1813, March and April, p. 238, (in the cerebellum.)—*Schallgruber* in Allg. med. Annalen, 1814, August, p. 557, (on the right hemisphere, together with a tumour.) —*le Fils* in *Rust's* Magazin, Vol. V. Part II. p. 235, (in the cerebellum.)—*Laugier* in Recueil de Méd., Chir. et Pharm. milit. Vol. VIII. 1820, p. 179, (in the cerebellum.) —*Bush* in London med. and phys. Journal, 1823, Decemb., (a large encysted abscess.)—*Hamilton* in Transact. of the med. chir. Soc. of Edinb. 1824, No. 22.—*Dickson* in London med. Repository, Oct. 1824, (unexpectedly.)—*Velpeau* in Archives générales de Médecine, Vol. VII. Januar. (in the Medulla oblongata.)—*Roloff* in *Nasse's* Zeitschrift für die Anthropologie, 1825, Part III. p. 172, (in one hemisphere without destruction of mental activity.)—*A. Cooper's* Lectures by *Tyrrel,* Vol. I. (several interesting cases.)—*Bellmer* D. de cerebelli degenerationibus. 4to. Bonnæ, 1825, (in the cerebellum; he also cites similar older cases.)—*Cruveilheir* in Nouvelle Bibliotheque, Novemb. 1826, (in the left hemisphere.)—*Nasse,*1826, Part III., (in the left hemisphere, without loss of mind.)—*Thilow* in *Pierer's* Allgem. medic. Annalen, 1827, November, p. 1441.—*Travers.* v. Magazin der ausländ. Liter. d. ges. Heilk. Jan. and Feb. 1828.—*F. Jones* in London med. and surg. Journal, 1828, Vol. L. p. 543.—Good engravings are given in *Baillie* Engravings, Fasc. X. p. 221, pl. 6.—*Hooper,* pl. 9.—Abscess in the brain of horses is described in Correspond. vétérin. Vol. II. p. 94; by *Schwab* Materialien zu einer pathol. Anatomie der Hausthiere, 1st part, p. 9; by *Dupuy* and *Vatel* Journ. prat. de Méd. vétér. Nov. 1827, p. 531.

(2) In such cases the brain is sometimes lost in considerable quantities by suppuration. In a young man who received a wound with a pitchfork, and was subsequently trepanned, a pultaceous mass as big as one's fist daily protruded from the aperture in the latter stage of the disease; after death I found the wounded hemisphere had suppurated away.

(3) That the diseases of the internal ear are, in many instances, communicated to the brain, is well known; but, oftentimes, affections of the ear and brain may occur simultaneously, and from the same cause. It is difficult to determine this, as large abscesses of the brain frequently exist for a long while, without either mental or bodily disturbance; and this indeed so much the more, as the Otorrhöe serves the purpose of counter-irritation. In many cases, also, the affection of the brain seems to be primary, and that of the ear secondary; compare the following cases, in which simultaneous suppuration of the internal ear and abscess of the brain were observed; viz.—*Bonetus* and *Lieutaud;* further, *Morgagni,* Epist. XIV. 3 and 5.—*Mögling* in Ephem. Nat. Curios. Cent. VI. Obs. 21.—*Laubius ib.* Cent. VII. Obs. 401, Cent. VIII. Obs. 21.—*Gontard* in Hist. de l'Acad. des Scienc. de Paris, 1756.—*Ballonius* Opera omnia. Vol. I. p. 196, 4to. Genev. 1762.—*Leblanc* in Journ. de Médec. Vol. XVII. p. 455.—*Stoll* Prælect. p. 149.—*v. Mohrenheim* Beobachtungen. Vol. I. p. 98, Wien 1780.—*Schumacher* Medic. chir. Bemerkungen. Kopenh. p. 381, 1800.—*Portal* Cours d'Anat. médic. Vol. IV. p. 99.—*Murray* D. Abscessus auris internæ observatio. Upsal. 1796. v. *Rudolphi's* Schwed. Annalen. Part I. p. 110.—*Sabatier* Médecine operatoire, Vol. III. p. 10, 2d edit. 1811.—Medical Commentaries, Vol. II. p. 180.—*Frank* Interpret. clinicæ, Vol. I. p. 142.—*Brodie* in Transact. of a Soc. for Improvement, &c. Vol. III. p. 106.—*Rust's* Magaz. Vol. II. Part II. p. 311, and Vol. IV. Part I.

p. 197.—*Parkinson* in London medical Repository, January to May, 1817.—*O'Brien* in Transact. of King's and Queen's College, Dublin, Vol. II. p. 309.—*Palletta* Exercit. pathol. Vol. I. p. 2.—*Itard* Traité des maladies de l'oreille et de l'audition, p. 70. Paris, 1821.—*Duncan* in Edinb. med. and surg. Journal, Vol. XVII. p. 331, July, 1821, fourth and fifth case. I have described six instances in my Selt. Beob. Part II. p. 96. — *Holst* in Magazin für Naturvidenskaberne, 1st Part, Christiania, 1825. — *Lallemand*, Vol. II. p. 239 and 306.—*Abercrombie*, p. 41, ff. — *Hoffmann* Otorrhœa cerebralis primaria in *Harles's* N. Jahrb. der deutsch, Medic. u. Chir. 2 Supplement. p. 43, 1827.

(4) It is so natural to assume, from analogy with the examples in other parts, that abscesses in the brain may penetrate the skull by external fistulous openings, that it is merely respect to *Morgagni's* opinion, which is not, however, general, but only meant for his own two cases, which has induced *Lallemand* to hold the cerebral abscesses connected with the caries of the ear *always* secondary. But that it may be also primary, *Brodie*, *Itard*, and myself in my Selt. Beob. Part II. p. 96, (before I was aware of the latter's opinion,) and *Hoffmann* have endeavoured to show by reasoning and examples. If inflammation of the ear precede that of the brain, why, on the contrary, should not that of the brain precede that of the ear? and the rather, as abscesses of the hemispheres descend into the lowest part of the middle lobes, and here come in contact with the petrous bone, into which the pus, on account of the thinness of the covering of the semicircular canals and drum, might easily penetrate; the effort of all abscesses towards external parts can hardly find a more favourable outlet. If the abscess be in the cerebellum below the tentorium, the pus penetrates into the internal auditory passage, or makes its way out by an aperture behind the ear. v. *Itard*, p. 254, Obs. 22, and *Abercrombie*, case 3, p. 35. I have already mentioned above, that in suppuration of the cerebral membranes, the pus sometimes passes through fistulous openings in the skull; the same also occurs in abscesses of the brain at other parts, as well as on the ear. v. *Hill*, Cases of Surgery, p. 130.—*Pretty*, in London Med. Repository, Vol. XX. Sept. 1823, (through the frontal bone.) — *Rosenthal* Abhandl. a. d. Gebiete der anat. physiol. und pathol. Berlin, 1824. — *Syme*, in Edinb. med. and surg. Journal, July, 1828, (on the forehead.)—*Lithell* in Svenska Läkare-Sällskapets Handlingar, Vol. VII. p. 220, (on the left parietal bone.)—*Duncan*, in case sixth, (through the sphenoid and temporal bone.)—*Raikem* in Répert. gén. d'Anat. et de Physiol. pathol. Vol. I. No. 2, p. 295, (through the petrous and sphenoid bones, and the nose) ;—similar cases to the latter are described by *C. G. Frank* in Ephem. Nat. Cur. Dec. II. Ann. VI. Obs. 193, (flow of pus from the nose through a carious sphenoid bone.)—*Bartholin* Histor. anat. Cent. II. Hist. 34, Cent. VI. Hist. 13.—*Thoner* in *Haller's* Bibl. med. pract. Vol. III. p. 22.—*Leblanc*. —Sometimes in abscess of the brain the skull is not penetrated, but only eroded. v. *Lieutaud* Lib. III. Obs. 1131.—*Horn's* Archiv f. med. Erfahr. p. 288, March and April, 1813. A steatoma of the brain, also, by its irritation, gave rise to caries of the auditory organ. v. *Neumann* in *Hufeland's* Journal, 1824, p. 14.—*Lallemand* is not quite correct, when he says, p. 282, that pus never penetrates any other way than through the ear. The notion of the priority of abscesses of the brain to the affections of the ear is also supported, by the fact, that in several of the above-mentioned cases the disease was a consequence of injury of the head, which had affected the brain more than the ear.

§ 237.

Proportionally is the brain rarely found MORTIFIED,[1] and then almost always from external injury alone, in which having been bruised, it inflames, and sinks, or when injuries of the head have been improperly treated. The substance of the brain is then found dissolved, fœtid,[2] orange-brown, and even grey and blackish coloured. Mortification of the brain appears to arise very rarely from internal causes, and we must take

especial care to distinguish the great softening and deep colour of the brain from gangrene.[3]

(1) *Lyserus* D. de sphacelo cerebri. Lips. 1656.

(2) It is an interesting circumstance, that the brain, without being gangrenous, sometimes has a very disagreeable smell, which I have observed in a few cases, when, upon putrefaction of the brain, the stink was indescribable.—Similar cases have been observed by *Morgagni*, Epist. VII. 9; XIV. 5.—*Greding* Sämmtl. Medic. Schrift. Vol. I. p. 306.

(3) I have not yet seen gangrene of the brain from these causes, and I believe that death would ensue before active inflammation of the brain could run into gangrene. The observations on gangrene, in the old writers, are therefore all extremely doubtful, because, till the present time, softening of the brain was called putrefaction and mortification, and all dark colouring of the brain esteemed gangrenous.—Even *Abercrombie*, if I do not mistake him, considers the proper softening of the brain as analogous to gangrene.

§ 238.

Another and equally rare vice of texture in the brain, is the DEPOSITION OF CARTILAGE AND OF LIME in its tissue, and the consequent production of more or less large and numerous CARTILAGINOUS, BONY, and STONY CONCRETIONS in it.[1] Frequent morbid irritation and chronic inflammation of the brain, gout, and tubercles in the brain, seem to give rise most commonly to this change of texture. The lime is in such cases found either in very small quantity, scattered about like sand in one part of the brain, so that it grates when cut through; or it is collected in larger quantity at one spot, so that it assumes a chalky or gypsum-like appearance, and a certain degree of brittleness; or lastly, it forms separate bodies of very different forms, which are deposited in the substance of the brain, and sometimes even contained in delicate cysts, which, according to their appearance and solidity, we are accustomed to call fibro-cartilaginous tumours,[2] bony or stony concretions.[3] A true ossification of the brain, that is, its conversion into bony substance, is never found, but it is always rather a removal of the nervous mass.

(1) The fabulous accounts of the older writers respecting the entire, or almost entire conversion of the brain of men and animals into bone or stone, if indeed they are founded on any observation, may perhaps always be referred to great enostosis of the skull. Comp. § 122, note 27 and 28.—Further, *Seb. Scarabicii* Historia cerebri bovini in lapidem mutati. Patav. 1655.—To these belong also probably the completely stony human brains, in the fossil collection at Lisbon. v. *Domeier* in Journ. d. ausländ. med. literat. by *Hufeland*, *Schreger*, and *Harles*, Vol. I. p. 258.

(2) Compare § 239, note 1.

(3) *J. Kentmann* De calculis in hominibus. 8vo. Tigur. 1565.—Miscell. Acad. Nat. Cur. Dec. II. Ann. I. Obs. 32, p. 76, 1682, (a stony concretion, as large as a bean, from the brain of a fallow-deer.)—*Schelhammer*, *ib.* p. 332.—*Chr. Vater* De ossiculo in cerebro nato, *ib.* Dec. III. Ann. IX. and X. p. 294. — *Tyson*, in Phil. Trans. 1697, No. 228, p. 535, (in the quadrigeminal body.)—*Drelincourt* in *Manget's* Theatro anat. L. IV. C. II. p. 309, (the pine as large as a hen's egg,

and stony.)—*Littre* in Mém. de l'Academ. de Paris, 1705, p. 55, (the cerebellum and part of the medulla oblongata chalky.)—*Blegny* Zodiac. Gallic. Obs. 14, p. 87, (a stone, as large as a bean, at the junction of the optic nerves.)—*Veratti* in Comment. Bononiens, Vol. II. Part I. p. 184. — *Hunauld* in Mémoir. de l'Acad. des Sciences de Paris, 1734, p. 44 and 59.—*Lieutaud, ib.* 1737, p. 51 and 71; and Hist. anat. med. L. III. Obs. 179, p. 56, 4. (on the cerebellum of an epileptic person, and in the pine.) — *Deidier* Traité des tumeurs contre nature, Paris, 1738, p. 351, (in the left striated body.) — *Adami* D. de causis quibusdam specialibus apoplexiæ, etc. Halæ, 1764, (a stone as large as a pigeon's egg.) — Compare *Meckel* in Mém. de Berlin, 1754.—*Greding* v. *Ludwig's* Adversar. med. pract. Vol. II. p. 448, and Vol. III. p. 658. — *de Haen* Ratio Medendi, Vol. II. p. 186, (the infundibulum full of lime.)—*Schweikhard* Medic. gerichtl. Beobacht. Vol. III. p. 304. Strasb. 1789, (the hinder part of the hemisphere full of sand.)—*Metzger* D. continens bigam Obs. anat. pathol. p. 3. Regiom. 1792, (pons varolii ossified.)—*Mursinna* Medic. chir. Beobacht. p. 115. Berl. 1796, (a tumour in the corpus callosum.)—*F. J. Walter* Anat. Museum, Vol. I. No. 291. p. 145,—*Caldani* Opusc. anat. p. 51. Patav. 1803, (a stone in the optic beds.)—*J.* and *C. Wenzel* De penitiori structura cerebri, p. 104 and 105, (an earthy kernel in the tumour.) — The Reviewers in Leipz. Lit. Zeitg. 1813, No. 25, p. 103, found small grains of sand in the appendage of the brain. — *Home*, in Philos. Transact. 1814, Part II. p. 469—486, (many earthy substances in the cerebellum and limbs of the brain in an idiot boy.)—*Boyer* v. *Cruveilhier* Essai sur l'Anat. pathol. Vol. II. p. 84.—*Schallgruber* Aufs. u. Beobacht. p. 59, Grätz 1816, (grains of sand in a tumour.)—*Prochaska* in Oestreich. med. Jahrb. 1819, Vol. V. Part III. p. 83, with plates, (a large stony concretion.) — *Hutchinson*, in Med. chir. Transact. Vol. IV. p. 202, (in a tumour of the brain, fat, cartilage, and bone.)—*Nasse* in his appendix to *Abercrombie*, translated by *De Blois*, p. 16, Bonn, 1821, (a tumour in the cerebellum, with patches of lime and coagulated lymph alternately.)—*Andral* in *Magendie's* Journ. de physiol. Vol. II. p. 110, (in a consumptive person, a chalky concretion as large as a pea in the upper part of the left hemisphere.—*Tacheron*, Vol. III. p. 380, (a tumour, which grated when cut.) — *Neumann* in *Hufeland's* Journ. July, 1824, p. 28, (stony concretions in the hemisphere under the pia mater, one of which was almost as large as a pea.)—*Rosenthal* Abhandl. a d. Gebiete der Anatomie, Physiologie u. Pathologie, p. 113. Berl. 1824, (a splinter of bone in the cerebellum.)— *Abr. Berg* præs. *Weber* Observatio tumoris et ossificationis cerebelli, ossificationem substantiæ cerebralis et phænomena morbi illustranda. 4to. Lips. 1826.—*Bergmann* in *Mende* Beobacht. u. Bemerk. a. d. Gebertshülfe u. gerichtl. Medicin. Vol. III. Gött. 1826, (a tumour in the base of the left ventricle, consisting of many sandy round bodies and soft substances, as large as a walnut.)—*Hooper*, The morbid Anatomy of the human brain, &c. tab. 12, has engraved a bony tumour from the brain.—In the Bresl. Mus. there is a large tumour, No. 2295, from the brain, containing earthy matter in many parts; and No. 8425, an irregular bony concretion, an inch and a half long, and almost an inch thick, which was found in macerating a skull, and probably belonged to a tumour in the brain.—In the Anat. pathol. Mus. at Vienna, I saw No. 2331 and 2361, two round smooth stones, as large as peas, which had the appearance of vein-stones, but without any accompanying history. Were they vein-stones from a sinus?—I also saw there a very firm brain from an epileptic person, with extensive ossification in one hemisphere, and a pine, the greater part of which was stony.

§ 239.

On account of their frequency as well as their consequences, SPURIOUS FORMATIONS of various kinds are very important morbid phenomena in the brain. As they for the most part produce a mass as solid as the brain, are also frequently separated from it by a distinct membranous cyst, indeed even only

embedded in it; they commonly excite, by their irritation, inflammation, softening, or suppuration in the neighbouring parts, and then seem, as it were, separated from the other parts of the brain; we apply to them the but little characteristic names of NODES, *nodi*, CEREBRAL TUMOURS, *tumores cerebrales*,[1] &c. Although in many cases it is difficult to distinguish them, as the colour, size, consistence, and texture vary exceedingly, and they run so gradually into each other, it seems, however, that they may in general be divided into encysted tumours, tubercles, and sarcoms. To the former kind belong the WATERY BAGS, *hygromata*, and HYDATIDS,[2] found in the substance of the brain, which either lie tolerably exposed on the surface, or are found buried in the interior of the brain, and vary in size from that of millet seed, to that of a small apple, &c.; if they be small, sometimes numerous, but if larger, commonly single. To these hydatids and watery cysts, are connected the cysts which contain mucous-like, albuminous and bloody secretions of different consistence; lastly, true fatty and gritty tumours which contain fatty and albuminous substances.[3] TUBERCULAR AFFECTIONS of the brain[4] are common, not merely in youth, but also in more advanced life. The characteristic tubercular mass is sometimes deposited pretty regularly in the substance of the brain at one spot, and gives it a yellowish white and firm character; sometimes it affects a part of the brain in a granular and more distinct form; lastly, it sometimes forms isolated and tolerably large roundish knobs, which are not unfrequently surrounded by delicate cellular membranous coverings. The colour and consistence of these tubercles is very different, as they are observed at first in their hard, irritated, inflammatory, softened, and even purulent state.[5] The SARCOM has, either as in the other parts of the body, the nature of the general or fleshy sarcom, and then consists of a tissue of cellular substance, minute vessels, cysts, and inorganized albuminous masses, &c., or rather, that of MEDULLARY SARCOM.[6] True scirrhus and cancer never occur primarily in the brain.[7]

(1) *Lieutaud*, Vol. II. Lib. III. Obs. 194—224.—*A. Salomon* D. de quibusdam cerebri tumoribus, Edinb. 1810.—*A. B. Hertel* D. de cerebri et meningum tumoribus, 8vo. Berol. 1814, with plates, (three cases contributed by *Rudolphi*.)—*C. E. J. Hammer* præs. *Rosenmüller* D. anat. pathol. s. tumorum morbosorum in cerebro observationes novas, 4to. Lips. 1817, with plates.—*Nasse* Ueber Geschwülste im Gehirn, appendix to *Abercrombie*, Patholog. and Pract. Remarks on diseases of the Brain and Spinal Marrow, translated into German by *de Blois*, Bonn, 1821.—*C. L. H. Calow* D. de tumoribus cerebri, 4to. Berol. 1826, with plates.—*Burdach* Vom Baue u. Leben des Gehirns, Vol. III. p. 543—550.—Of the numerous individual cases, the following are most important: *Fel. Plater* Observ. Lib. I. p. 13 and 108.—*Boneti* Sepulchretum anat. L. I. Sect. 1, Obs. 56, 63, Sect. 2, Obs. 53, Sect. 3, Obs. 29.—*Willis* De scorbuto, Cap. III. § 4.—*J. Harderi*

Apiarium, p. 238, Obs. 58, 4to. Basil, 1687, (in the cerebellum and medulla oblongata.)—*Jon. Rhodii* Observat. medicar. Cent. I. Observ. 55, Patav. 1757, (in one ventricle.)—*Wagner* in Ephem. Acad. Nat. Curiosor. Dec. II. Ann. X, and *Vallisnieri, ib.* Cent. VIII. App. p. 72, (in the right ventricle.)—*Lancisi* De subit. mort. p. 39, (scirrhus in the medulla oblongata,) and De noxiis paludum effluviis, L. II. Epist. III. cap. 6, p. 218, (a white, hard, granular-like body in the cerebellum.)—Mém. de l'Acad. de Scienc. de Paris, 1705, No. 13, (in the cerebellum and medulla oblongata.)—*Santorini* Observationes, p. 51.—*Fantoni* Opuscula med. et physiol. p. 87 and 202, 4to. Genuæ, 1738, (as large as a walnut, in the brain.)—*la Peyronie, ib.* 1741, p. 208, (in the fourth ventricle, as large as an egg.)—*Buonav. Perotti* in Raccolta d'Opusculi scientifici e fisiologici in Venezia, Vol. XLVII. 1751, p. 339, (as large as a nut, in the right hemisphere.)—*Zinn* in Comment. Soc. reg. Scientiar. Goetting. Vol. II. 1752, (two cases in children.)—Mém. de l'Acad. des Sc. de Paris, 1754, p. 63, (in the right hemisphere, as large as a hen's egg.)—*Huber* Pr. observat. aliquot. anat. Cassellis, 1760, (in a child, in the medullary substance of one hemisphere.)—*Meckel* in Mém. de l'Acad. de Berl. 1754, p. 70, (a scirrhus in the cerebrum,) 1761, p. 61, (in the cerebellum,) 1764, p. 84, (a scirrhus in the left hemisphere.)—*Morgagni* Epist. LII. 15, (scirrhus in the cerebellum.)—*Röderer* Pr. de cerebri scirrho. Goett. 1762.—*Galli* in Atti dell' Acad. delle Scienze di Siena, Vol. II. p. 210, (one as large as a hen's egg, in the right ventricle.)—*Haller* Opera minora, Vol. III. Obs. 1, p. 282, (scirrhus cerebelli.)—*Marcot* in Mém. de la Soc. de Montpellier, Vol. I. p. 334, Lyon, 1766, (scirrhus.)—*Brown Cheston,* Pathological Inquiries and Observations in Surgery, &c. p. 142. 4to. Lond. 1756, (a fungous growth.)—*Forlani* Rarior. obs. med. anat. Vol. I. p. 49, Senis, 1769, (an encysted tumour, in the left ventricle.)—*Baader* in *Sandifort's* Thesaurus Dissert. Vol. III. p. 38, (a fatty body as large as a walnut, in the right hemisphere.)—*Richter's* Chir. Biblioth. Vol. II. Part I. p. 159.—*Desportes* in Histoire des maladies de St. Domingue, Vol. II. p. 209, Paris, 1770, (an encysted tumour, with fat in the pine as large as an egg.)—*Greding* in *Ludwig's* Advers. med. pract. Vol. II. Part II. p. 492, (large, in the right hemisphere.)—*Brisseau* in Samml. chir. Bemerkungen, Vol. I. p. 198, (an encysted tumour as large as a hen's egg, in the cerebellum.)—*Meier* in *Baldinger's* Magazin, Vol. IV. Part I. p. 1.—*Leveling* D. de carie cranii militis quondam venerei. 4to. Ingolst. 1777.—*J. Conrad* De hydrocephalo cum fungo cerebelli conjuncto. 4to. Argentor. 1778.—*Schmucker* Samml. vermischt. chir. Schriften, Vol. I. p. 247, (as large as a nutmeg, in the left ventricle.)—*Baumes* in Journ. de Médec. 1791, June.—*Nasse,* in *Abercrombie,* has collected the following cases, two of his own; in one, twenty-one tubercles in the cerebrum; and in the other, a tumour in the cerebellum. Further, *Reil* Memorabil. clinica. Fasc. III. p. 39, (several tubercles in the cerebrum and cerebellum.)—*Blane,* in Transact. of a Soc. for the improvement of medic. and surg. Knowledge (in the brain and pine).—*Wenzel* De penitiori struct. cerebri, p. 104, 105.—*Earle* in Medic. chir. Transact. Vol. III. p. 59, 1812, (several in the hemispheres in a boy.)—*Hutchinson, ibid.* Vol. II. p. 113; and Vol. IV. p. 197, (three cases.)—*Powel* in Medic. Transact. Vol. V. 219, 234, 241.—*Farre* in Samml. auserl. Abhandl. f. prakt. Aerzte. Vol. XXV. p. 21.—*Merat* in Bulletin de la Fac. de Médec. de Paris, 1815, No. 4, p. 335, (three cases.)—*Cruveilhier* Essai sur l'anat. pathol. Vol. I. p. 300, (encysted tumour in the left hemisphere.)—*Meckel* Handb. der pathol. Anatom. Vol. II. Part II. p. 329, (in the left ventricle.)—*Rosenmüller* in *Hammer,* p. 17, (in the right hemisphere two as large as hazel-nuts.)—*Bock, ibid.* p. 25, (one as large as an egg, in the right hemisphere of a boy;) p. 28, (scirrhi in the cerebrum andcerebellum of ascrofulous child.)—*Buchanan* in Edinb. med. and surg. Journ. Vol. VIII. p. 276.—*Steinbuch* in *Hufeland's* Journal, Aug. 1815, Vol. XLI. Part II. p. 104.—*Arvers* in Bullet. de la Fac. de Méd. de Paris, 1815, No. I. p. 260.—*Chomel* in Nouv. Journ. de Méd. March, 1818, p. 1.—*Rose* in London med. Repos. 1819, No. 61, p. 12.—Besides the already mentioned cases, *Abercrombie* has also cited the following, case 82, p. 175, (an encysted tumour in the cerebellum.)—*Latham* in Med. and phys. Journ. July, 1826, (in the cerebellum.)—*Planque* Bibliotheque, Part III. p. 348, (in the cerebellum, as large as a pigeon's egg.)—*Bouillaud*

Traité de l'Encephalite, 1825, (a scirrhus in the right hemisphere.)—*Chambers* in Med. and phys. Journ. July, 1826, (in both hemispheres, and in the cerebellum.)—*Cruveilhier* in Nouv. Biblioth. de Médec. Nov. 1825, (a scirrhus in the right hemisphere.) *Hay*, case 14, (the size of a walnut, on the Turkish saddle.) *Coindet* Sur l'hydrocephale, p. 98, (a hard tumour on the pons varolii.)—*Hay*, case 20, (tumour as large as an orange.)—*Rochoux* Sur l'Apoplexie, (a tubercle as large as a nut, in the cerebellum.)—*Beilby*, case 27, (one as large as an egg between the cerebral membranes in a child.)—*Bouillaud*, case 32, (many large scrofulous tumours in a boy in both hemispheres.)—*Yelloly* in Med. chir. Transact. I. p. 181, (on the pons varolii and medulla oblongata.)—*Rostan* Recherches sur le ramollissement du cerveau. Paris, 1820, (in the right hemisphere a cancerous-like tumour as big as a turkey's egg.)—*Gooch* in *Abercrombie*, p. 437, (two encysted tumours.)—Edinburgh Journal. Vol. XI. p. 470, (in the pons varolii.)—Bulletin de la Faculté de Médec. de Paris, May, 1816, (as large as a hen's egg, in the left hemisphere.)—*Hawkins* in Med. and physical Journal, 1826, (many scrofulous tumours on the cerebrum and cerebellum.)—*Camell* in Medical Repository, Vol. VII. p. 92, (on and in the cerebellum.)—*Hunter*, case 40, (as large as a pigeon's egg in the right hemisphere.)—Medico. chir. Transact. Vol. IV. p. 188, (as large as a hen's egg in the left hemisphere.)—*Rostan*, case 44, (an egg-shaped tumour in the right hemisphere.) Some other cases are:—*Salmade* in *Sédillot's* Recueil périodique de la Soc. de Médec. de Paris. Vol. XXVII. p. 153, (in the left hemisphere.)—*Fribault* and *Marechal ibid.* Vol. XLIV. p. 369, (scirrhus cerebri).—*Thomann* Annal. der klinischen Anstalt zu Würzburg für das Jahr. 1800. Würzb. 1803, (on the pons,) with a plate.—*Donald Monro* in Medic. Transact. Vol. II. p. 325.—*J. de Roose* in Verhandlingen van het Genootsch. te Antwerpen. D. I. Bl. 109. *Salter* in Edinb. med. and surg. Journ. Vol. XI. p. 469, (in the pons.)—*Kelch* Beiträge zur pathol. Anatomie, Berl. 1813, No. 64, (on the cerebellum, perhaps only the flock enlarged); No. 66.—*Horn* in his Archiv f. med. Erfahrung, 1813, March and April, p. 238, (as large as a pigeon's egg, on the pons.)—*Rudolphi, ib.* p. 508, (an encysted tumour in the right hemisphere.)—*Edholm* in Svenska Läkare-Sällskapets Handlingar, Vol. I. p. 41, Stockh. 1813, (as large as a walnut, scirrhus of the gland. pituitaria.)—*Schallgruber* in Allg. medic. Annalen, 1814, August, p. 557, die Aufs. und Beobachtungen im Gebiete der Heilkunst. p. 59. Grätz. 1816, (in the right hemisphere.)—*E. Home* in Philos. Transact. 1814, Part II. p. 469—485; Sect VII. (four cases.)—*Zetterström* in Svenska Lakäre-Sällskapets Handlingar, 1815, Vol. II. Part II. p. 175.—*Trafvenfell, ib.* p. 191, (in the left hemisphere, as large as a hen's egg.)—*Nysten* in Bulletin de la Faculté de Méd. 1816, p. 183, (in a child three years old.)—*Biermayer* Museum anat. pathol. No. 74, (a scirrhus.)—*Cruveilheir* Essai sur l'anatomie patholog. Vol. II. p. 80, (a fibro-cartilaginous tumour in the right hemisphere.)—*Meckel* in Archiv f. d. Physiol. Vol. III. p. 196, (in both hemispheres fatty and yellowish.)—*Wespthal* D. s. descriptionem tumoris in ventriculo cerebri laterali inventi, with illustrative engravings. 4to. Kiliæ, 1817, (in the right ventricle, large.)—*Rust* Magazin f. d. gesammte Heilkunde, Vol. V. Part I. p. 165, (encysted tumour.)—*Hebreart* in Bulletin de la Fac. de Médec. 1817, p. 399, in Annuaire medico-chir. Paris, 1819, (several cases.)—*Cerutti* Beschreib. der patholog. Präparate, No. 822, 823, and 827.—*Parent-Duchatelet* and *Martinet* Recherches sur l'inflammation de l'arachnoide. p. 439, 463. Paris, 1821.—*Niel* in l'Observateur Provençal des Scienc. medicales. Vol. II. p. 29, Marseille, 1821, (a medullary swelling as big as one's fist.)—*Ed. Neuley*, v. Sammlung auserlesener Abhandlungen zum Gebrauch für praktische Aerzte, Vol. XXVII. p. 226.—*Mitivie, ib.* p. 467.—*J. G. Wishart* in Edinburgh medical and surgic. Journal, July, 1822, p. 393.—*Itard* Von den Krankh. des Gehirns. a. d. Fr. Weimar, 1822, p. 78, (several small scirrhi.)—*Blicke* in London medical Repository, 1822.—*Andral* in *Magendie's* Journal de Physiologie, Vol. II. p. 105.—*Pfeuffer* in *Henke's* Zeitschrift f. Staatsarzneikunde, 1822, Part III. p. 84, (bean-shaped, lying upon the Turkish saddle, between the hemispheres.)—*Lebidois* in Archives générales de Médec. Paris, July, 1823, (as large as a hen's egg, in the right hemisphere.)—*Krukenberg* Jahrbücher der ambulator. Klinik zu Halle, 1823, Vol. II. Sect VI. No. 1, (two

cases, in the one as large as a Borsdorf apple, in the right hemisphere.) — *Piedagnel* in *Magendie's* Journ. de Physiol. Vol. III. p. 247, (several large knots.) —*Tacheron* Recherches anat. pathologiques, Vol. III. p. 45 and 381, (tubercles in a child.) — *Rezzio* in Ripertorio med. chir. di Torino, 1823, (an encysted tumour.) — *Ward*, in London med. Repository, September, 1823, Vol. XX. p. 217, (a tumour projecting from the region of the mucous gland,) and April and June, 1824, (two instances in the cerebellum.)—*Ollivier*, Traité de la moëlle épinière et de ses maladies, &c. 2 vols. 8vo. Paris, gives several instances of tumours in the medulla oblongata. — *Rosenthal* Abhandlungen aus dem Gebiete der Anatomie, Physiologie, und Pathologie, p. 113, Berlin, 1824, (in two scrofulous children in the cerebellum, and in an adult, in the neighbourhood of the striated bodies.) — *Hesselbach* Beschreibung. der pathol. präpar. zu Wurzburg, 1824, p. 361, No. 267, 275; p. 398, No. 241.—*Schneider* D. de magna quadam encephali destructione ejusque sequelis, 8vo. Berol. 1823, (three steatomatous tumours in the left hemisphere.)—*Ozanam* in Journ. compl. du Dict. des Sc. Médec. Aug. 1824, (six scirrhous knots, as large as hazel-nuts, on the left hemisphere, with caries of the skull.)—*Ahlberg* and *A. Retzius* in Ars-Berättelse om Svenska Läkare-Sällskapets Arbeten, lemnad af *Eckström*, 1825, (a tumour as big as a hazel-nut, in the corpus rhomboideum cerebelli.)—*Fr. Bellmer* D. de cerebelli degenerationibus, 4to. Bonnæ, 1825, (tubercular knots in the cerebrum and cerebellum in the first case; and in the third, a knot as large as a nut in the cerebellum.) — *Berg* præs. *Weber* Observatio tumoris et ossificationis cerebelli, &c. 4to. Lips. 1826. — *Bergmann*, v. *Mende* Beob. und Bemerk. a. d. Geburtshülfe und gerichtl. Medicin. Vol. III. Gött. 1826, (in the left hemisphere, containing earth.)—*R. Wade*, in London Med. and Physic. Journ. May, 1826, (a hard, lightish brown tumour, as big as an egg, in the left hemisphere.) —*Tiand* and *Dubreuil* in Ephémérides médicales de Montpellier, Vol. I. April 1826, (on the left side of the cerebellum, and on the medulla oblongata.)— *R. Hooper*, The Morbid Anatomy of the human Brain, &c. pl. 6, 11, 12, and 13. —*Pagenstecher* in *Harles's* N. Rhein. Jahrb. d. Medic. u. Chir. Vol. XII. Part III. p. 1, (a tumour on the left hemisphere.) — *Monro*, The morbid anatomy of the Brain, Vol. I. chap. 5, Edinb. 1827.—*de la Motte*, in Philadelphia Journ. of the Med. and Phys. Sciences, Aug. 1827.—*Cruveilhier* Anatomie pathol. 2 livrais. pl. 6, (several cases, fatty tumours, also two cases of *Dupuytren* and *Leprestre*.)— *Dav. Mayer* D. de cerebri tumoribus, 4to. with plates, Berol. 1829. I have found tumours in the brain eight times, of the scrofulous or steatomatous kind. Compare Selt. Beob. Part I. p. 107; Part II. p. 94. Verzeichn. No. 2295—2300; since then, another case, No. 8502 of Bresl. Mus. viz. several scrofulous knots in the cerebellum.

(2) On hydatids of the cerebral membranes, compare § 225.—On hygroma and hydatids in the brain itself, v. *Lieutaud*, L. III. Sect. 3, Obs. 194.—There are also instances in *Lancisi* De subitan. mort. L. I. Cap. 11, p. 35. — *Schwencke* D. rari casus explicatio anat. med. Hag. 1737. v. *Haller's* Coll. Diss. pr. Vol. VII. No. 260.—*Fantoni* Opusc. med. et physiol. 1738, p. 22. — *Schaarschmidt* Medic. und chir. Nachrichten, Vol. III. p. 363. — *Kaltschmid* De nervis opticis in cadavere latis inventis. Jenæ, 1752. — *Berdot* in Actis Helvet. phys. med. Vol. V. p. 183, (a very large watery cyst.) — *Goutard* in Journ. de Médec. Vol. IV. p. 132. — *Morgagni* Epist. Anat. I. 20. — *Forlani* Obs. med. pract. Anat. Senis, 1769. — *Balme* in Journ. de Médec. Vol. XLI. p. 526. —*Hufeland's* Journal, Vol. V. p. 813.—*Portal* Cours d'Anatomie Médic. Vol. IV. p. 41, 72. — *Pyl* Aufsätze und Beobachtungen aus der gerichtl. Arzneiwissenschaft, Vol. II. p. 37. — Medical Repository, Vol. III. v. *Abercrombie*, p. 440, case 39. — *Wenzel* Ueber den Hirnanhang fallsüchtiger personen, p. 74. — *Ib.* De penitiori structura cerebri, p. 114. — *E. Home*, first case. — *Morrah* in Med. Chir. Trans. Vol. II. p. 260. — *Horn's* Archiv. 1815, Part V. p. 842. — *Biermayer* Museum anat. pathol. No. 247 and 285. — Tübinger Blätter f. Naturwissenschaft und Arzneikunde, Vol. III. p. 51, (in the pine.) — *Headington* in Edinb. med. and surg. Journ. Vol. XV. p. 504. — *Morrah* in Med. chir. Trans. Vol. II. p. 262. — *Cerutti* Beschreibung der pathol. Präpar. No. 822 and 823.—*Rostan* Recherches sur le ramollissement du cerveau, Cap. 10, p. 166.—

Rentdorf D. de hydatidibus in corp. hum. præsertim in cerebro repertis, p. 36. 8vo. Berol. 1822, with plates.—*Romberg* in *Nasse's* Zeitschrift, 1822. Part III. p. 195.—*Neumann* in *Hufeland's* Journal, July, 1824, p. 29.—*Jacobi*, 1st case, (in the pons.)—*Calow*, 2d case, (in the pons, as large as a hen's egg.)—*Bailey* in London medical Repository, Feb. 1826, (one large and several small in the fourth ventricle.) *Hooper*, pl. 14.—*Nordblad* in Ars-Berättelse om Svenska Läkare-Sällskapets Arbeten, lemnad af *Eckström*, p. 37. Stockholm, 1827, (on the striated bodies as large as a bean.)—*Abercrombie*, p. 175, case 82; in Bresl. Mus. there are two instances, No. 8694, (one as large as a hazel-nut,) and No. 8704, (an encysted tumour, consisting of fatty substance and hydatids.)—It has been already mentioned above, in speaking of apoplexy, that after the absorption of the blood, cysts are sometimes found filled with serum.

(3) The contents of encysted tumours vary as much in the brain as in those of other parts; mucous and albuminous secretions, in various degrees of coagulation, are commonly found in them. Sometimes the albumen is almost coagulated, deposited in concentric layers, and even mingled with earthy parts. Often, with the albumen, there is a large quantity of fat mingled, which is never yellow, but similar to tallow, (stearine, and perhaps also cholesterine,) light, greyish, and smeary, forming a substance not very dissimilar to brain. Sometimes these fatty tumours have a silvery or shining white lustre, especially their cysts, viz. in some cases of *Rudolphi*, *Braun*, *Parent-Duchatelet*, and the three cases of *Cruveilhier's*.—I also found, in a tumour of the cerebral membrane, containing hair, which protruded through an aperture in the hemisphere into the ventricle, its cyst shining like mother-of-pearl. v. § 234, note 4.—*J. Veratti* once found, in the lateral ventricle of a woman, a knot of hair as big as a pea, mingled with small white granules, (probably fat.) v. Comment. Bononiens. Vol. II. Part I. p. 184. — The thickness of the cyst varies not less, sometimes it is very inconsiderable, especially in fatty tumours, and in other cases of cartilaginous hardness.

(4) The greater number of tumours of the brain have this character, and almost all which I have examined in a recent state belong here. —Of the cases quoted in note 1, those which appear to me may be properly included here are those of *Zinn*, *Huber*, *Morgagni*, Ep. LII. 15, *Haller*, *Nasse*, 1st case, *Reil*, *Blane*, *Earle*, *Merat*, *Rosenmüller*, *Bock*, *Abercrombie*, 1st edit. p. 226, case 1 and 2, *Bouillaud*, *Chambers*, *Hay*, *Rochoux*, *Hawkins*, *Camell*, *Powell*, *Rudolphi* s. *Hertel* in two cases, *Horn*, 1813, p. 238, *Rostan*, *Mitivie* and *Deslandes* in *Parent-Duchatelet*, *Piedagnel*, *Tacheron*, *Rosenthal*, *Hesselbach*, No. 398, *Schneider*.—*Baillie* Morbid Anatomy, p. 442, under the name of white firm substance. — *Sömmerring's* addenda to *Baillie*, note 537.—*Bellmer*, in 1st case.—*Baumes* Ueber die Erblichkeit der Skrofeln u. Beispiele von Skrofeln im Gehirne. v. *Hufeland's* Neueste Annalen der franz. A. W. Vol. II. No. XI. p. 73. — *Ch. Bell*, Anatomy of the human Body, Vol. III. p. 36.—*Biermayer* Museum anat. pathol. No. 544, (in the cerebellum.)—*Lobstein* Compte rendu, etc. p. 51. — *Ozanam* in Journ. compl. du Diction. des Scienc. médic. Vol. XIX. p. 189. — *Berard* in *Magendie's* Journ. de Physiologie, Vol. V. No. 1 and 2, p. 17. — *Mitivie* Beobacht. und Bemerk. über die hitzige Gehirnhöhlenwassersucht. Leipz. 1823, (several cases of his own; he considers tubercles not unfrequently the cause of dropsy of the brain.) — *Gendrin* Recherches sur les tubercles du cerveau et de la moëlle épinière in Annales de l'école médicale. Jan. 1823.—*Bertin* in Ephémérides médicales de Montpellier, Vol. I. April, 1826, (in the cerebellum of a boy ten years old.) — *Chambers* in London med. and phys. Journ. July, 1826.—*Earle* in Medico-chir. Transact. Vol. XIII. Part II. London, 1827.—*Huillier* in Ephem. médic. de Montpellier, Vol. VI. Sept. 1828.—*Evans* in Edinb. medic. and surg. Journal, April, 1828.—*Guibert* in Revue médic. franç. et étrangère, June, 1828, (in the cerebellum, three cases.)—Good plates are given in *Baillie's* Engravings, Fasc. X. pl. 7, 227; and in *Hooper*, pl. 11 and 12.—Tubercles also occur in animals. — *Dupuy* De l'affection tuberculeuse, p. 265, Paris, 1817, mentions a tuberculous glandula pinealis in a horse.—I saw large tubercles, one of which was as big as one's fist, from the lateral ventricle of a horse; and from oxen in the veterinary school at Munich. I also once found tubercles in the brain of a monkey.

(5) Sometimes they are homogeneous, tough, whitish, and hard; sometimes partially or generally soft, running into suppuration; many of the cerebral abscesses quoted are indeed suppurating tubercles.

(6) Several of the tumours cited in note 1 may belong here; but to medullary sarcom especially the following. v. *J. Wardrop*, Observations on Fungus Hæmatodes, or Soft Cancer, &c. p. 30,—35, 47, 59, 74, 8vo. London, 1809, (several cases simultaneous with medullary sarcom of the eye.)—*Lerminier* Ueber eine carcinomatöse Affection des Gehirnes in Annuaire medico-chir. des Hôpitaux, &c. 1819, No. 4, p. 225.—*Rostan*, p. 84, Obs. 20, (he calls it cancer.)—*Panizza* Annotazioni anat. chir. sul fungo midollare dell' occhio, etc. Pavia, 1828, (in a boy, simultaneous with medullary fungus of the eye.)—*Tacheron*, Vol. III. p. 380.—*Wedemayer* in *Rust's* Magazin f. d. ges. Heilk, Vol. XIX. Part II. p. 222, (in the left hemisphere.)—*John Hunter*, in Medico-chir. Transact. Vol. XIII. Part I. with a plate, London, 1825, (particularly in the optic couches of a girl of seventeen years.)—*Gregory* in London medical and physical Journal, Decbr. 1825.—*Latham* in London medical and physical Journal, Vol. LVI. or new series, Vol. I. July, 1826, (descending from the cerebellum into the spinal canal.)—*Pagenstecher.—Martin Ware*, *ibid.* Vol. LVIII. p. 502, (with medullary sarcom of the eye.)—I have described three cases, viz. two in the right hemisphere, and one in the appendage. v. My Selt. Beob. Part II. p. 90, No. 38 and 39; Verzeichn. No. 2291—93; the former of these is also described by *Arnold*, D. s. fungi medullaris in cerebro inventi exemplum, etc. 8vo. Vratislaviæ, 1822.—I saw in the Anat. pathol. Mus. at Vienna, one case of medullary sarcom of the cerebral appendage.

(7) The numerous cases of scirrhus in the brain arise, as I think, generally from inflammatory and tubercular indurations, from fibrocartilaginous tumours, and from sarcoma. They may perhaps occur secondarily from cancer in the orbit, as well as be communicated from the neck to the brain, although, so far as I know, this has not been observed.

§ 240.

Lastly, the brain is also sometimes subject to VICES OF CONTENTS, inasmuch as not merely are morbid secretions of different kinds frequently found in the cavities, and in the substance of the brain, but sometimes also EXTRANEOUS SUBSTANCES, first, PARASITIC ANIMALS, viz. MITES, *gamasus marginatus*,[1] and of the entozoa, in men, monkeys, and pigs, the *cysticercus cellulosæ*, Rud.;[2] in sheep, antelopes, and oxen, the *cœnurus cerebralis*, Rud.;[3] and in rare instances in man, the *echinococcus hominis*, Rud.:[4] secondly, all hard substances which have accidentally entered the brain, as needles, bullets, dagger and sword points, splinters of bone, &c., which sometimes remain for a long time and even for life, without inconvenience[5]; in the latter case, they are often, as in other parts, enclosed in a plastic bag.

(1) *Herrmann* Mém. aptérologique. fol. Strasb. 1804, Fasc. VI. pl. 6.

(2) They rarely occur in the brain, so that I have never found them; there is, however, an old preparation, No. 2304, in the Bresl. Museum, in which a quantity of cysticerci are loosely embedded in the cortical substance of the brain beneath the vascular coat.—Compare *Rudolphi* Entozoorum hist. naturalis u. Synopsis, p. 180 and 546.—Further, *Bremser* Ueber lebende Würmer im lebenden Menschen. Wien, 1819.—*K. Himly*, in his and *Hufeland's* Journ. Decemb. 1809, p. 116, pl. 3. — *Hopfengärtner*, *ibid.* Vol. LI. Part IV. p. 32. — *Romberg* in *Nasse's* Zeitschrift f. die Anthropologie, 1823, Part III. p. 197. — *Rosenthal*,

p. 114.—*Bremser* found it in a cercopithecus, p. 237, and *Rudolphi* Synopsis, p. 547; they are frequently found in pigs.—*Flormann* found them in a pig, affected with the gid, not merely on the membranes and in the substance of the brain, but also twenty of them loose in the right ventricle. v. Kongl. Vet. Acad. Handlingar, p. 132. Stockholm, 1815.

(3) They are especially frequent in sheep affected with the gid, in the lateral ventricles; sometimes also in mad staggers in the fourth ventricle, although rarely in the substance of the brain. I have recently found such a cyst in the right hemisphere of the cerebellum, near its external surface. If the cyst become large, or there are two or three of them, the brain is very much expanded, and the skull itself at the spot absorbed or expanded like a bladder.

(4) I found one in the lateral ventricles of the brain weighing two pounds and three drachms, in which there were seventy-one echinococci. v. *Rentdorf*, p. 36.—Perhaps the case found by *Burnall* in the Appendix to *Baillie's* Morbid Anatomy was similar.

(5) Compare the surgical writers. Interesting cases are found in *Boneti* Medic. septentr. collat. Part I. p. 59 (a sword point fourteen years); and Biblioth. chir. Cent. I. Obs. 73, (the point of a poniard five years.)—*Zacutus Lusitanus* Opera. Vol. II. L. B. 1657, Prax. med. admirand. Lib. I. p. 2, Obs. 6, (a piece of the blade of a knife eight years.)—*Anel* in Mém. de l'Acad. de Chir. Vol. II. p. 131, (a bullet in the region of the pine some years.)—*Quesnay, ib.* (a bullet a year.)—*Le Dran* Observations de Chirurgie, p. 127. Paris, 1731, (a bullet one year in the region of the saddle); p. 161, (small shot discharged on the thirty-seventh day, the person recovered.)—*Volaire* in Journ. de Médec. Vol. XX. 1764, p. 553, (a bullet two years.)—*Morand* Opuscules de Chirurgie, Vol. 1. p. 59, Paris, 1768, (a bullet nine years and a half.)—*Brisseau* Sammlung. chirurg. Bemerk. Gotha, 1758, Vol. I. p. 171, (a piece of iron which had been thrust in during trephining made its appearance again after four months.)—*Vater, ib.*, Vol. II. p. 305, (a small shot seven weeks.)—*Schmucker* Samml. vermischt. chir. Schriften. Vol. I. p. 277, Berl. 1785, (a bullet four months.)—*Majault* in Journ. de Médec. Vol. XLI. p. 82, (the point of an arrow nine years.)—*Camperdon* in Samml. für Wundärzte, Vol. II. p. 112, (a piece of the but of a firelock three months.)—*Sala* in Dict. des Sciences médic. Vol. VII. p. 50, (the point of a sword during the whole life, without inconvenience.)—*Paroisse* in Opuscules de Chirurgie, p. 1, Paris, 1806, (a soldier who received a bullet into his head, through the temple, was cured.)—*Langlet* in Bulletin de la Faculté de Médecine. Dec. 1810. p. 233 (a bullet eighteen months.)—*Reich* in *Hufeland's* Journal, 1815, (a bullet nine months).—*Fance* in Journ. de Méd. Chir. et Pharm. milit. par *Biron* et *Fournier*, Paris, 1816, Vol. II. (a bullet a-year after the external wound closed.)—*Zinck, ib.*, Vol. XII. 1822, p. 221, (a pebble which had been shot seventeen months.)—*Kirby*, Dublin hospital Reports, &c. Vol. II. 1818, (a large piece of a bullet several months).—Utforlig och med ojäfagtiga intyganden verificera Berättelse, &c. 8vo. Stockholm, 1818, (two screws which had been shot in twenty-one years and three quarters, without inconvenience.)—*Krüger-Hansen* in *v. Gräfe* and *v. Walther's* f. Chir. Vol. III. Part IV. p. 627, (forty large small shot, without inconvenience.)—*Busch* in Petersburger Abhandl. a. d. Gebiete. der Heilkunde, Part II. 1823, p. 215, (a piece of a gun-stock, the man walked on foot with it 180 wersts, 130 miles.)—*Rogers* in Med. chir. Trans. Vol. XIII. No. 2, 1827, (a piece of the stock of a cannon three inches long, and three ounces in weight, twenty-one days.)—Instances of pins in the brain are mentioned by *Portal* Cours d'Anatomie Médic. Vol. IV. p. 101.—*Manne* in *Tartra* Bullet. des. Sc. Médic. Vol. V. p. 317, and *Flajani*, v. *Valentin* Voyage médical en Italie. Nancy, 1822.

SECOND CHAPTER.

Of the Spinal Marrow.[1]

A.—OF THE MEMBRANES OF THE SPINAL MARROW.

§ 241.

The MEMBRANES OF THE SPINAL MARROW are, as is well known, the same as those of the brain, and would consequently require but little particular observation, were it not that in a pathological view, there are certain peculiarities, which arise principally from the different proportions of the brain and spinal marrow to their bony investments,[2] as well also as from the peculiar form, disposition, and structure of the spinal marrow. It therefore seems proper to mention only the points in which they agree with the cerebral membranes, and to dwell on their peculiarities.

(1) Compare the works quoted at § 216, and the works on diseases of the spine, § 135.—*J. P. Frank* Oratio de vertebralis columnæ in morbis dignitate. Paviæ, 1791; v. Samml. für prakt. Aerzte, Vol. XV. p. 284.—*J. B. Mayer* D. de sano et morboso medullæ spinalis statu. 8vo. Vindeb. 1808.—*Alex. Demussy* Histoire de quelques affections de la colonne vertébrale et du prolongement rhachidien de l'encéphale. Paris, 1812.—*V. Racchetti* Della struttura, delle funzione e delle malattie della midolla spinale. Milano, 1816.—*Asch* præs. *Meckel* D. de vitiis quibusdam medullæ spinalis minus cognitis. 4to. Halæ, 1816.—*J. Abercrombie* on diseases of the spinal marrow in Edinb. med. and surg. Journ. Vol. XIV. p. 42.—*Ollivier* Essai sur l'anatomie et les vices de conformation de la moëlle épinière chez l'homme. Diss. inaug. Paris, 1823, and Traité de la moëlle épinière et de ses maladies, &c. Paris, 1824 and 1827; translated into German, with additions, by *J. Radius*. Leipz. 1824.—*C. L. Stapf* Spec. inaug. s. conspectum morborum medullæ spinalis. 4to. Tübing. 1824.—*Koreff* Affection de la moëlle épinière. Paris, 1825.—*Hutin* in Nouvelle Biblioth. 1828, Jan. and Feb.

(2) It is well known that not merely the arachnoid and vascular coats are much more loosely connected with the spinal marrow than with the brain; but also the dura mater of the spinal cord is not so firmly attached to the bones as that of the brain. Injuries and diseases of the spinal bones, therefore, are not so immediately communicated to the membranes of the central nervous system as in the head; but in the greater mobility of the vertebræ, and on their looser structure, depend many peculiar morbid effects on the spinal marrow.

§ 242.

The SIZE and FORM of the membranous bags investing the spinal marrow are in general proportioned to that of the spinal canal and marrow itself, and may therefore with these be irregular in various ways. The EXTENSION which the cerebral

membranes are subjected to so frequently and to such extent in water of the head and rupture of the brain, &c., occurs also in the membranes of the spinal marrow under similar circumstances; more rarely however, and of course less extensively, although it is almost always congenital, as the early closing up of the spinal canal very much opposes its subsequent formation. In reference to DISCOLORATION[1] and VICES OF CONSISTENCE, the membranes of the spinal marrow resemble those of the brain, and, as other irregularities, are observed more seldom on the former than on the latter.[2] VICES OF CONTINUITY occur distinctly not merely from thrust, cut, and shot wounds, but also from splinters of bone in fracture of the spine, which, however, on account of their looser connexion, less frequently occur than in the membranes of the brain; they arise also from violent concussion and extension: the latter occurs particularly in cleft spine.[3]

(1) *Dubrevil* v. Ephémérides médicales de Montpellier, Aug. 1826, found in an embryon of three months, the arachnoides and pia mater of the brain and spinal cord yellow.

(2) It appears to me, that this is not only founded on the rare dissection of the spinal canal, and the difficult examination of the spinal cord; but that vicious states of the medulla spinalis are extremely rare: I have myself opened many spinal canals, and not unfrequently seen them opened, but I have found disorganizations in them proportionally less frequent than in the skull. I have often merely found morbid effusion of fluid. — *Ollivier*, p. 77, is also of opinion, that the spinal cord is one of the least affected organs.

(3) Compare below, on the Spinal Marrow, § 246 and 247.

§ 243.

INFLAMMATION and its consequences deserve the first notice among VICES OF TEXTURE in the spinal membranes. Here also must be distinguished that state of morbid irritation and congestion which commonly occurs, as in acute fevers, in many eruptive diseases, hydrophobia, tetanus, *epilepsia spinalis*, convulsions, paraplegia, &c., from true inflammation, which, however, occurs also in the same diseases.[1] To the latter applies in general, all that has been said about the several membranes of the brain; it is not unfrequently followed by the EFFUSION OF PLASTIC LYMPH,[2] distinct THICKENING,[3] CONSOLIDATION of the several membranes with each other, and with the spinal canal;[4] ULCERATION, and also MORTIFICATION. In rare instances we find, on the arachnoid coat of the spinal marrow, CARTILAGINOUS and BONY CONCRETIONS, which, on account of the mobility of the spine, are not large, but mostly small, sometimes appear as numerous scales or leaves, especially in the region of the back and on its posterior surface.[5] HYDATIDS,[6] TUBERCULAR[7] and SARCOMATOUS TUMOURS[8] on the spinal membranes, are still more rare.

(1) Unpractised anatomists easily mistake the redness which the under surface of the fibrous coat frequently exhibits, as an indication of inflammation; which redness, however, generally arises merely from the numerous veins here situated, in which, by the position of the corpse on the back, the blood collects according to the laws of gravitation.

(2) The bodies found in the cerebral membranes, under the name of Pacchionic glands, or granulations of the brain, appear to be deficient in the spinal membranes.

(3) I have found, in a few instances, the dura mater of the spinal marrow thickened a few lines in spots, from the chronic inflammation arising from caries of the vertebræ.—*Abercrombie*, p. 365, mentions, from the London Med. Obs. and Inquir. Vol. III. a case of hardening of the spinal membranes; a less degree of thickening and opacity in the arachnoid of the spinal marrow, is not unfrequent.

(4) This adhesion of the dura mater with the spinal canal occurs most commonly in spina bifida. I have, however, occasionally seen it at different parts without this.

(5) I consider it rare, because I have never myself found it, and it is therefore much more rare than in the cavity of the skull. Examples are given by *Morgagni*, Epist. XXV. 9, (one as large as a gourd-seed.) — *Sömmerring* addenda to *Baillie*, p. 248, note 524, (almost cartilaginous, thickened, chalk-like spots.)—*Chaussier* in Bulletin de la Faculté de Médec. Vol. V. p. 154, (bony concretions.) —*Esquirol, ib.* p. 426, (in an epileptic patient, many little bony plates.)—*Horn* in Archiv f. medicin. Erfahrung. March and April, 1813, p. 237, (many bony scales in a person who died of tabes dorsalis.) The same case is described and engraved in *Hertel* D. de cerebri et meningum tumoribus. 8vo. Berol. 1811, with engravings.—*J. F. Meckel* Handb. der menschlichen Anatomie, Vol. III. p. 603. —*Brayne*, in London medical Repository, July, 1820, (in two persons who died of tetanus.)—*Swan*, Observations on some points relating to the anatomy, physiology, and pathology of the nervous system, Cap. 7, London, 1822, (cartilaginous spots in one healthy, and another epileptic person.) — *Lobstein* Compte rendu, &c. p. 54, (little cartilaginous laminæ.) — *Ollivier*, p. 344, (many pieces of cartilage in a woman.) — *Velpeau* in Archives générales de Médecine, Jan. 1825; and in *Magendie's* Journ. de Physiologie, 1826, No. 2, p. 138, (cartilaginous plates in a paraplegic person.) — *Barbier* v. *Abercrombie*, p. 373, I saw cartilaginous plates on the spinal arachnoid coat, in the museum at St. Thomas's Hospital, London, in the museum at Pavia, and in the Anat. path. Mus. at Vienna. The nerves within the spinal canal had a chalky appearance, whilst situated in an abscess in this region. v. *Harrison*, in London med. and physical Journ. May, 1823, Vol. XLIX.—*Ollivier*, p. 344, also observed little bony concretions on the external surface of the spinal dura mater.

(6) *Esquirol*, p. 426, (many hydatids in a cyst of the arachnoid.)—*Chaussier*, in two cases; in one, between the dura mater and the spinal canal, and in connexion with a large hydatid cyst in the chest and belly; and Proces verbal, &c. 1807, v. Journal de Médecine continué, Vol. XIV. p. 231; and in a note to the 40th letter of his edition of *Morgagni* De sed. et caus. morbor. new edit. Lutet. 1822. — *Reydellet* in Dict. des Scienc. médic. Vol. XXXIII. p. 564, (it arose from a tumour connected externally with the spinal canal.) — *Mirault*, in *Ollivier*, p. 360.—In a sheep, v. *Fischer* in Miscell. Acad. Nat. Cur. Dec. III. Ann. II. Obs. 53.

(7) *Ollivier*, p. 345, in two cases. Cases from *Bayle*, *Gendrin*, and *Harder* are related by *Abercrombie*, p. 371; one case is also described by *Serres*, in Anat. comp. du Cerveau, Vol. II. p. 234.—*Wittfeld* in *Horn's* Archiv., May and June, 1827, (as large as a bean.)

(8) *Knox* in London medical Observations and Inquiries, Vol. III. p. 160, (fungus duræ matris.)—*Philipps* in New medical Journal, Vol. I. p. 144, (medullary sarcom of the membranes and the spinal cord.)—*Horn* in his Archiv f. medic. Erfahrung. 1815, Vol. V. p. 838, (a sarcomatous tumour on the dura mater of a person who died of tabes dorsalis.)—*Reid* in Transact. of the association of the King's and Queen's College of Physicians in Ireland, Vol. I. Dublin, 1817, (a

white mass resembling brain, in a boy who died of tetanus.)—*Ollivier*, p. 175, (eighteenth case.)—*Velpeau*, (a reddish yellow tumour, of the consistence of brain, compressing the front of the spinal cord between the sixth and third cervical vertebra.—*Doublis* in Mém. de l'Acad. Roy. de Med. de Paris, Vol. I. 1828, No. 2, (according to the description, cancer between the layers of the arachnoid in the region of the tenth dorsal vertebra.)—*Monod* in Nouv. Biblioth. médic. May, 1827, (a lobular fibrous swelling between the arachnoid and pia mater.

§ 244.

As FLUIDS of different kinds are found collected between the cerebral membranes, so is this not unfrequently the case with the spinal membranes. Of course the MORBID CONTENTS are found in the bag formed by the arachnoid membrane; although not unfrequently also between it and the vascular membrane, which is here but loosely connected with it, and also sometimes between the dura mater of the spinal marrow and the spinal canal. As to the causal proportions of such extravasations, that which has been already said in reference to the cerebral membranes applies to those of the spine; we are not, however, to consider all the fluids here collected as the product of disease of the spinal membranes, as they may descend from the cavity of the skull and even from the cavities of the brain.[1] Those preceding diseases which commonly are situated in the spinal marrow, as tetanus, epilepsy, paraplegia, &c., great injection of the cerebral membranes and other conditions allow us to conclude sometimes with tolerable certainty on the primary and idiopathic affections of the spinal membranes. To the irregular contents of these membranes belong, first, COLLECTIONS OF AIR,[2] which are in some cases here observed without any suspicion of putrescence; next, a large or smaller quantity of water and lymphatic fluid, a kind of DROPSY OF THE SPINE, *hydrorrhachis*,[3] either as an acute or chronic disease; it may occur alone, or in connexion with dropsy of the head, and if in high degree, usually produces palsy by pressure on the spinal marrow; then PUS, which is here collected either in ulceration of the spinal marrow and its membranes,[4] or from the cavity of the skull,[5] from carious vertebræ,[6] as well also as effused from abscesses in the neighbourhood;[7] lastly, also BLOODY FLUID and PURE BLOOD in a fluid or coagulated form, arising both from injuries affecting the spine, and from internal causes.[8]

(1) According to *Magendie*, v. his Journ. de Physiologie, Vol. V. No. 1 and 2, p. 27; Vol. VII. No. 1, p. 1 and 66; Vol. VIII. No. 2 and 3, p. 211.

(2) *Ollivier*, p. 269, calls it *Pneumatorachis*, and gives several instances of it; also *Briere*, v. Nouv. Biblioth. Feb. and March, 1826, observed it. I have several times found air between the spinal membranes, but I would not venture to declare, as the bodies were not quite fresh, that the air was the product of an exhalation during life.

(3) Respecting the peculiar, or commonly only so called dropsy of the spinal canal, or spina bifida, see further on § 246. On dropsical collections in the

spine, v. *Morgagni* Epist. IV. 7, 21, 24, 30; V. 11; X. 13, 17; XI. 13, 15; XV. 6; XXI. 47; XXXVIII. 34; LIV. 49; LXI. 2, &c.—*Pet. Frank* De curand. hom. morb. Lib. VI.—*Copeland,* Observations and symptoms of the diseased spine, &c.—*Itard* in Dict. des. Scienc. médic. Art. Hydrorrhachis. Vol. XXII. — *Ollivier,* p. 248, and *Abercrombie,* p. 358. In order to show the collection of water, it is necessary to make a cautious opening of the spinal canal and skull. I have found this several times in animals; viz. in monkeys and dogs, especially in tubercular disease; in sheep with the gid; I have also found, in a stag which I kept for many years, and which at last was attacked with palsy of the hinder limbs, a considerable quantity of water in the spinal canal.—[I lately examined the body of a boy who had died of tetanus, and found four drachms of water in the arachnoid. T.]

(4) In a great number of persons who were bed-ridden, I have found the spinal membranes inflamed in the sacral region, and much pus collected between them.

(5) I have observed this in two instances; also in a man who had suppuration of the cerebral membranes after injury of the head, and in another man with cerebral abscess. A similar one to the last is mentioned by *Denmark* in Med. Chir. Trans. Vol. V.

(6) So also, in destruction of the spine, originating from intervertebral disease, as well also as from the bones themselves, pus is frequently effused into the canal of the spine, and produces paralysis of the lower half of the body, by pressure on the spinal cord. Similar cases are described by *Brodie* in Pathol. and surgical observations on diseases of the Joints. Cap. VI.; and *Velpeau* in Archives générales de Médecine. Vol. VII. March.

(7) I have seen lumbar abscesses occasionally without caries of the lumbar vertebræ effuse pus into the spinal canal through the intervertebral holes.—*Harrison* found one psoas abscess communicating with another on the opposite side through the vertebræ. Effusion of pus from a psoas abscess into the vertebral canal is described by *J. Jackson* in New England Journ. of Med. and Surgery, Vol. V. Boston, 1816. From a cancerous ulcer, with palsy of the legs.—*Franke* in *Kausch's* Memorabilien der Heilkunde, Staatsarzneikunde und Thierheilkunde, Vol. III. No. 6. From ulceration of the covering of the sacrum, *Lisfranc* v. Heidelberg klinische Annalen, Vol. IV. 1828; Supplement, p. 143. In horses and cattle, inflammatory tumours in the neck, and in horses, ulcers on the withers, sometimes effuse pus into the spinal canal. Compare § 135, note 56.

(8) Effusion of blood into the spinal canal appears by no means so rare as is usually supposed. I have seen it, not merely in four cases in persons who, in consequence of falling from a great height, were killed by concussion of the brain and spinal cord, and in a boy who had been struck violently several times upon the back with a piece of wood; but also frequently in apoplectic, or hanged persons, in one who died of tetanus, and in children which were destroyed in difficult delivery. We must however be careful in cases in which the blood is fluid, and often during the opening the spinal canal, effused from the numerous gorged veins which are wounded around the spinal marrow, not to mistake it for a morbid phenomenon. In a boy who had suffered severe concussion of the neck, ten months after, blood was found in the spinal canal. v. *Howship,* Practical Observations on Surgery, &c. case 30; in a boy who died of hydrophobia, lumps of black blood found in the spinal canal, v. *A. T. Thomson,* Med. Chir. Trans. Vol. XIII. p. 2, 1827. In apoplexy the blood is sometimes found effused simultaneously in the skull and spinal canal, of which long since, *Bonnet* Sepulchret. Anat. Lib. I. Sect. II. p. 84, and *Morgagni,* Epist. III. 2; also, recently, *Ollivier,* case 32. It also occurs in the apoplexia spinalis, or medullaris, in the spinal column alone.—*Duverney* v. *Duhamel* in Reg. Scient. Acad. hist. An. 1632, Sect. V. Cap. II. p. 264.—*Boerhaave* Prælect. ad Institut. § 501.—*Brera* and *Harles* Ueber die Entzündung des Rückenmarkes, p. 26, Nürnb. 1814. —*Chevalier* in Medico-chir. Transact. Vol. II. No. 9.—In a horse from violent exertion, v. Journ. de Médec. continué. p. 150, Feb. 1811.

B.—OF THE SPINAL MARROW ITSELF.

§ 245.

The FORMATION OF THE SPINAL MARROW is sometimes IMPERFECT in a high degree; for although its total and congenital absence occurs only in those rare monsters of which the whole trunk is deficient;[1] yet, in acephalous monsters, it is deficient at the upper part, in proportion to the deficiency of the neck, breast, and belly; and in those monsters of which the lower part of the vertebral column is deficient, so also is there absence of that part of the spinal cord.[2] The spinal marrow, more commonly, seems to be absent, in which case, it has been so destroyed and its development so retarded before birth by dropsy,[3] either in itself or its membranes, that there is often only found a very imperfect rudiment of it, or merely of its coverings. The opposite vice, or an EXCESS OF FORMATION, occurs only in double monsters, in which, with a double spine, their exists a double spinal marrow, or the single spinal marrow exhibits, at its upper or lower extremity, the trace of a corresponding duplication, according as the duplicity is at the upper or lower part of the body.[4]

(1) For instance, monsters consisting merely of a head, or one limb, though there appears sometimes, even in these, a rudiment of the spinal marrow, as in the cases of *Rudolphi*, read before the Academy of Berlin, June, 1816;—and *J. Hayn* D. monstri unicum pedem referentis descriptio anatomica, Berlin, 1824, with engravings;—even in the most shapeless monsters, which appear to be, as it were, merely a lump of flesh, with few or no intestines, traces of a spinal cord have been found, to wit, *Bland* in Philos. Transact. 1781, Part I. p. 363, and *G. Vrolik* Mémoires sur quelques sujets interessans d'Anatomie et de Physiologie, 4to. Amsterd. 1822. The account given by *Clarke*, in Philos. Transact. 1793, Part II. p. 154—164, that in an acephalous monster, the spinal marrow and all the nerves were deficient, probably arose from an imperfect examination.

(2) As in the calves, No. 1009 and 1060, described by *G. Sandifort*, Museum anatomicum, Vol. III. p. 294. If in animals the tail be monstrously deficient, the extremity of the spinal cord is also wanting. *Burdach* observed this in a dog. v. *Meckel's* Archiv f. Physiol. Vol. IV. p. 80, and I have seen it in a dog, a calf, and a fowl, without the tail bones.

(3) Compare further on.

(4) The spinal cord divides at an angle for the two heads, or the two hinder limbs, into two equal parts, of which, however, where one head is smaller than the other, &c., that branch of the cord is also smaller. Sometimes the cord is larger, previous to the point of division, and the indication of division shows itself by a groove in the central line. Those cases are rare in which, after having divided, the spinal cord again unites, and sometimes divides anew. v. *Barkow* Monstra animalium duplicia, etc. Vol. I. pl. 7, fig. 1, 4to. Lips. 1828; or in which the lower end of the spinal cord divided into two has a third, as it were, inserted. v. *Barkow*, fig. 2; or, lastly, when in a double monster, in which both bodies are united by the trunk, the caudal extremity of one spinal cord is imperfectly attached to the other. v. *Tiedemann* in his, and *H. B.* and *L. C. Treviranus* Zeitschrift für Physiol. Vol. III. Part I. pl. 3, fig. 2.

§ 246.

The spinal marrow deviates, in various ways, from regular SIZE and FORM. In general, it corresponds to the length and form of the spinal column, thus may it be too long, too short, curved, &c., in proportion to the other parts of the body; sometimes it is unnaturally THIN, either throughout or only at certain parts. This vice is sometimes original and congenital, especially in correspondence with monsters with deficient or distorted heads and limbs;[1] sometimes a later, that is, a morbid diminution, a wasting, occurs, as is commonly the case in DORSAL CONSUMPTION, *tabes dorsualis* or *myelophtisis.*[2] In the latter case the spinal marrow appears in some places indented, as it were knotty.[3] Sometimes it is to a greater or less extent very thin, when it is COMPRESSED by the neighbouring bones,[4] by the thickened intervertebral substance, by bony concretions and thickening of the membranes of the spinal marrow, by varicose swelling of the veins in the vertebral canal, by aneurysm of the vertebral arteries at their exit from their canals,[5] by hydatids, and other swellings,[6] and by fluids effused in the vertebral canal. The opposite vice, irregular size, is also sometimes observed, in which case the spinal marrow is, congenitally, EXTREMELY THICK at certain parts,[7] or is morbidly swollen at one part, or lastly, it still remains in newborn children unnaturally LONG, as in the early stage of fœtal existence, and extends more or less further down into the lumbar and even into the sacral region.[8] The form of the spinal marrow is principally and most frequently affected by DROPSY OF THE SPINAL MARROW, *hydrorrhachis, hydrorrhachia,* which is also called CLEFT SPINE, *spina bifida,* when connected with an open state of the spinal canal.[9] As the time of the origin of this disease, its extent, complication, and degree is different, so does also the state of the spinal marrow and its membranes vary remarkably. Naturally it is a congenital disease, connected with cleft of the vertebral canal, and is often naturally complicated with hemicephaly,[10] hydrencephalocele,[11] and internal dropsy of the head,[12] and is for the most part very fatal from paralysis;[13] in rare cases, however, it has been seen occurring after birth and even in adults.[14] In the most severe form of the disease, the spinal marrow is entirely wanting, and we find merely the membranes fallen together, usually slit at one or more spots, or even more or less degenerated and adherent to each other, forming sometimes a closed sac filled with lymph.[15] In the subsequent stages of this disease we observe also rudiments of the spinal marrow, little pultaceous masses of medullary substance and blood, or

loose and separate nervous bundles, or the anterior columns running parallel but separate from each other, or the spinal marrow, as in the early state of the fœtus, open behind, broad and flat, &c. In the milder and more common state of the disease there is found only on one, or very rarely on two,[16] distinct spots, a more or less large swelling containing water, sometimes flat, sometimes semilunar or necked, the sides of which are formed by the expanded spinal membranes, often adherent and otherwise morbid, which are protruded through the cleft in one or more vertebræ, and commonly connected with the very thin and extended common integuments.[18] The watery swelling is most frequently observed in the lumbar region,[19] more rarely in the sacral,[20] and dorsal, least commonly in the cervical, except in the case of coexisting hemicephaly or hydrencephalocele, in which the *spina bifida* always occurs in the neck, and from this point protrudes more or less outwards.[21] The seat of the water is naturally in the spinal marrow itself, which at this part is very much expanded, broken up, and even entirely destroyed, and usually exhibits the canal, in its axis, open and expanded up to the brain; sometimes also the water is contained at the same time between the membranes of the spinal marrow, or in the most uncommon cases in them alone, whilst the spinal marrow itself is observed healthy, or merely compressed.[22] Sometimes the swelling also contains hydatids. Lastly, dropsy of the spinal marrow occurs also in rare cases without any external swelling, and without cleft in the spinal column, so that the canal in the axis of the spinal marrow, which in man is naturally closed, becomes more or less widely expanded by the water, with coexisting increased thickness of the marrow itself,[23] or the water is poured out only in the substance of the marrow itself,[24] and one spot of the organ becomes distinctly swollen.

(1) In acephalous monsters, the upper extremity of the spinal cord often terminates, like the spinal column, very thin or pointedly; with the fore extremities the upper, with the hind extremities the lower enlargement of the spinal cord is deficient, and also with deficient limb on that side the enlargement is wanting. *Serres* found this in a child, a calf, and a lizard, of which the fore leg was wanting; and in two children, two cats, and a dog, without hind legs. v. his Anatomie comparée du Cerveau dans les quatre classes des animaux vertèbres. Vol. I. p. 107, Paris, 1824.—*Tiedemann*, p. 2, saw in a human monster without limbs, the spinal cord too small and thin by about half;—in a similar child, No. 2892 of my Verzeichn., I found it also very thin and without the enlargements. In other monsters with small limbs, it was very slender and without the enlargements; lastly, in a calf, of which the left fore leg was wanting, and which I had kept alive two years, the cervical enlargement was perfectly normal on the right, but totally wanting on the left side. v. No. 2312 of my Verzeichn.

(2) The whole spinal cord is rarely atrophic throughout, but usually only a part of it, viz. the lower extremity.—Compare *Schelhammer* D. de tabe dorsali, Jenæ, 1691.—Practical Essay on the Tabes dorsalis, London, 1748.—*Brendel* D. de tabe dorsuali, Goett. 1749, and in Opusc. med. cur. *Wrisberg*, Part II. p. 179,

Goett. 1769.—*Lewis*, Essay upon the tabes dorsalis, London, 1758.—*Percy* D. on the lues venerea, gonorrhœa and tabes dorsalis, London, 1787.—*de Plouquet* et resp. *Williardts* D. Exemplum singularis morbi paralytici, Tübingæ, 1806.—*Loewenhard* D. de myelophtisi chronica vera et notha, 8vo. Berol. 1812, with plates.—*Chr. v. Weidenbach* D. de tabe dorsuali, with plates, Berol. 1817.—*Schesmer* D. Tabis dorsualis adumbratio pathologica, 8vo. Berol. 1819, with plates.—*Gossow* D. de tabe dorsuali, 8vo. Berol. 1825.—*Guil. Horn* D. de tabe dorsuali prælusio, 4to. Berol. 1827; in which, besides the cases of *Horn's*, the individual cases of others are very well noted.—*Koreff* found the spinal cord extremely thin in a person who died of paralysis. v. *Magendie's* Journ. de Physiologie, Vol. IV. p. 372, Oct. 1824.

(3) This induced *Gall* to consider the spinal cord as a kind of ganglionic chain. *v. Weidenbach* has engraved a striking example of this kind at the lower end of the spinal cord. We not unfrequently find, without any disease, the spinal marrow terminating in one or two knotty tubercles. In a person who had died in consequence of onanism, the spinal marrow was very much wasted, and the nervous threads seemed as if unravelled; the nervous matter in the nerves of the cauda equina was also at the same time wasted. v. *Rust's* Magazin f. d. ges. Heilk. Vol. XXII. Part III. p. 476, with plates.

(4) For instance, if the spine be very much curved, has exostoses, some of the vertebræ dislocated, and is swollen or carious, as in spondylarthrocacy, &c. compare § 135, note 43 and 51.—Further, *Dubrevil* in *Ollivier*, p. 192, and *C. H. Parry*, (in both cases the origin of the spinal cord was compressed by displacement of the first vertebra.)—*Abercrombie*, p. 383, relates several similar cases.

(5) *Howship*, Practical Observations in Surgery and Morbid Anatomy, Lond. 1815, p. 59.

(6) A tumour, originating from the cerebellum, descended into the vertebral canal behind the spinal cord, to the origin of the sixth cervical nerve. v. *Latham* in London Med. and Phys. Journal, new series, Vol. I. July, 1826.

(7) If the neck be very short, the upper enlargement of the spinal cord is lost in the brachial nerves, and the whole cervical portion is then, as in short-necked beasts, extremely thick.—*Serres* once saw in a monster without legs, but with very powerful arms, the cervical portion of the cord remarkably large.

(8) This is particularly frequent in the case of spina bifida, as I have several times noticed; and as many others have also found it, viz. *Apinus* v. *Hochstetter* D. de spina bifida, Altdorf, 1703.—*Trew* in Commerc. Lit. Norimb. 1741.—*Morgagni*, Epist. XII. 16.—*Hoin* in Mém. de l'Academ. de Dijon, Vol. II. p. 106.—*Hutchinson*, in New London med. Journ. 1792, Vol. I. p. 338.—*Grashuys* v. Neue Sammlung für Wundärzte, Part X. p. 180—*J. F. Meckel* Handb. d. Pathol. Anat. Vol. I. p. 354.—*Béclard* in *Ollivier*, p. 111.—Also, without cleft spine, viz. in two children without feet, but with tails, it went to the tail-bones; and in two cats and a dog without hind legs, but with extremely long and large tails, the spinal cord was much larger in the lumbar and sacral region than usual. v. *Serres*.

(9) Also hydrorrhachitis according to *Sauvages* Nosolog. meth. 4to. Vol. II. p. 497.—On the state of the spinal column in this disease, compare § 135, and also its note 25, in which are quoted several papers on spina bifida.—On the seat of the water, and the state of the spinal cord, compare *Morgagni*, Epist. XII. and *Pet. Frank* De curand. hom. morb. L. VI. Part I. p. 198, (he divides it into hydrorrhachia incolumis, and dehiscens, and the latter again into generalis and partialis, viz. cervicalis, dorsalis, &c.)—*Bodin* D. sur le spina bifida. Paris, Ann. IX. p.8.—*Terris* Considerations générales et observations particulières sur le spina bifida in Journ. gén. de Médec. 1806, Vol. XXVII. p. 162.—Instances of sisters having spina bifida are mentioned by *Orth* D. de quibusdam tumoribus tunicatis ext. in *Haller's* Coll. Diss. med. chir. Vol. V. p. 412.—*Burgius* in Ephem. Acad. Nat. Cur. Dec. II. Ann. VI. Obs. 58.—*Henkel* Neue med. u. chir. Anmerk. Part IV. p. 54; and *Michaelis* in *Richter's* Chir. Biblioth. Vol. XVII. p. 133.—Of the very numerous cases, the most perfect are in *Moeckel* De hydrorrhachitide Commentatio. Lips. 1822. I mention only some of the most remarkable and novel, viz. *Ruysch* Obs. anat. chir. Obs. 34—36; and Thesaur. anat.

VIII. Part I. No. 2.—*Littre* in Mém. de l'Acad. des Scienc. 1701.—*Bidloo* Exercit. anat. chir. Dec. II. No. 7, with plates, p. 187, pl. 1 and 2.—*Mery*, in Mém. de l'Acad. des Sc. 1712. Obs. anat. 6.—*Trew.*—*Acrel* in Svenska Vetensk. Acad. Handlingar, p. 287, 1748.—*Morgagni*, Epist. XII. 16.—*Camper* Diss. de hydrope in Diss. X. Vol. II.; and Auserl. Abhandl. f. prakt. Aerzte, Vol. XVI. p. 446.—*Böhmer* Obs. anat. rar. Fasc. II. Præf. p. viii.—*Portal* in Mém. de l'Acad. des Sc. p. 238, 1770; and Cours d'Anat. médic. Vol. II. p. 304.—*Sandifort* in Obs. anat. pathol. L. III. cap. 1. p. 10; in Obs. anat. pr., in Exercit. acad. L. II.; and in Museum anat. with good engravings, tab. 124.—*Hutchinson.*—*Siebold* in Chir. Tageb. Nürnb. 1792. XXXIX. p. 84, etc. Recent cases in *Callisen* Systema chir. hodiern. Vol. II. p. 46, Havn. 1800.—*Oberteuffer* in *Stark's* Neuem Archiv f. d. Geburtsh. Vol. II. Part IV. p. 624.—*Stoll* v. *Posewitz* Journ. f. d. Med. u. Chir. Part I. Giess. 1802.—*B. Bell*, in System of Surgery, Vol. V.—*Abernethy*, Surg. and physiol. Essays, Part I. p. 75.—*Okes*, An account of spina bifida, with remarks on the method of treatment proposed by *Abernethy*, Cambridge, 1810.—*Sherwood* in Medic. Repository of original Essays, Vol. I. 1812-13.—*Meckel* Handb. d. pathol. Anatomie, Vol. I. p. 355 and 357.—*Racchetti.*—*A. Cooper*, in Med. chir. Transact. Vol. II. p. 324.—*Lobenwein* De monstrosa genitalium deformitate et spina bifida commentatio in Mém. de l'Academ. imp. des Sc. de Petersb. 1817, Vol. VI.—*Pliny-Hayes*, in New England Journal of Medicine and Surgery, Boston, July, 1817, (in the sacral region.)—*Palletta* Exercit. pathol. Cap. 10. Art. 3, Mediol. 1820.—*Neuendorf* D. de spinæ bifidæ curatione radicali. Berol. 1820, with observations by *Berndt.*—*Vaccà Berlinghieri* Storia di una idrorachia. Pavia, 1820.—*A. F. A. Foerster* D. de spina bifida, 8vo. Berol. 1820.—*Bened. Trompei* v. *Omodei's* Annali universali di Medicina. Vol. XV. Luglio, 1820; and *Locock*, in Edinb. med. and surg. Journ. Vol. XVII. p. 251, (the child lived to six years, and was punctured several times.)—*Brewerton, ib.* Vol. XVIII. p. 378, July, 1821, (a double spina bifida.)—*Jukes*, in London med. and phys. Journal, p. 106, Feb. 1822, (a very large tumour in a girl of nineteen).—*Gittermann* in *Harles's* Rhein. Jahrbüchern, Vol. V. Part I. p. 4.—*Jos. Frank* Prax. med. univ. præcept. Vol. I. Part II. Sect. II. cap. 4. § 16.—*Nyblaeus* in Abhandl. d. K. Schwedischen Akademie, 1822, Part II. p. 343.—*Carus* zur Lehre von Schwangerschaft u. Geburt. Part I. p. 227, 8vo. Leipz. 1822.—*Dugés* in Revue médicale française et etrangère. Paris, April, 1823, p. 370.—*Breschet* v. *Hasper* in *Hufeland's* Journ. April, 1823, p. 59.—*Urquhart* in American medical Recorder, July, 1823. v. *Gerson* and *Julius* Magazin der ausl. Lit. Jan. and Feb. 1824, p. 131, (the large tumour burst, and death ensued.)—*Baron* in London medical Repository, Vol. XXI. No. 128, Aug. 1824, (the cyst was several times punctured, but filled again.)—*Lindsay* in London medical Repository, January, 1826, (the tumour was often burst, although the child was thirteen years old.)—*Heusinger* Berichte von der anthropotomischen Anstalt zu Würzb. 1st Treatise, 1826, p. 50.—*Faber* Duor. monstror. humanor. descriptio anatomica. 4to. Berol. 1827, with two engravings.—*Potthoff* D. s. descriptionem casus rariss. spinam bifidam totalem et columnam vertebralem antrorsum insigniter curvatam exhibentis. Berol. 1827, with three engravings.—London medic. Gazette, December, 1827, (cured by puncture.)—*E. A. W. Himly* Darstellung des Dualismus am normalen und abnormen menschlichen Körper. p. 191, Hannov. 1829, (as big as a child's head on the sacrum). I have had three-and-thirty opportunities of examining spina bifida. v. my Selt. Beob. Part I. p. 66, No. 2313 of my Verzeichn., (in the lumbar region, cured); No. 2314, (in the lumbar region of a calf); No. 2955, (on the whole spine of a sheep); No. 3314 and 3315, (in the lumbar and sacral regions); No. 3316, (sacral region); No. 3317 and 3318, (in the lumbar region in two calves); No. 3319, (on the extremity of the sacrum in a calf); No. 8011, (on the rump); No. 8869, (in the lumbar region); of Bresl. Mus. The other cases were connected with the vices of the brain.

(10) It is well known that half the hemicephalic monsters, both human and animal, have also spina bifida. In the Breslau Collection, such is the case with twenty-one such monsters, viz. No. 2868—2875, 2881—2883, 2967, 2996, 3802, 3003, 3041, 8016, 8017, 8024, 8063, and 8833.

(11) Viz. *Bidloo*, in the first case.—*Penada*, in Saggio d'osservazioni e memorie,

etc. Padova, 1793, T. I. Obs. 1.—*van der Laar* Observ. chirurg. obstetr. anat. med. L. B. 1794, No. 3.—*Geoffroy* Philosophie Anatomique, Vol. I. Paris, 1822. —*Seerig* D. de hydrencephaloceles specimine eximio. 4to. Vratisl. 1822, with engravings, (is No. 2929 of Bresl. Mus.) — *Burkart*, D. de monstro humano notabili. 8vo. Friburg, 1825.—*Merye*, in Archiv. génér. de Méd. July, 1827.—*Potthoff.*

(12) Boneti Sepulchret. anat. L. I. Sect. XVI. addend. Obs. 4. — *Mayer* in Ephem. N. C. Cent. 1. Obs. 127.—*Brunner, ib.* Dec. III. Ann. I. Obs. 152 and 11.—*Murray*, Fœtus hydrocephalo interno correpti descriptio. Upsal, 1797.—*Stoll* Ratio Medendi, Part VII. p. 217.—*Morgagni* Epist. XII. 9.—*Grewe*, v. Samml. auserles. Abhandl. f. prakt. Aerzte, Vol. VIII. p. 584.—*Fielitz* in *Richter's* Chir. Biblioth. Vol. IX. p. 155.—*Portal, Baron, Pliny-Hayes*, and *Vaccà Berlinghieri.* This connexion is so common, that *Acrel* has improperly imagined it to be continual.

(13) There are, however, many instances given of such children living several years, and even reaching puberty, viz. one of the cases mentioned by *Acrel* and *Palletta* was seventeen years—eighteen, *Henderson's*—nineteen, *Jukes's*—twenty, in one of *Apinus, Hochstetter*, &c.; *Warner's* Observations in Surgery, p. 136. London, 1784,—twenty-eight years with spontaneous separation by gangrene, in a case of *Camper's*—even fifty years, v. *Schwagermann*, Ontleedheelkund. Verhandel. Amst. 1767.

(14) *Pet. Frank.* Delect. Op. Med. Vol. II. p. 92. Lipsiæ, 1791, (in a man forty-five years old.)—*Reydellet*, in Dict. des Sc. Méd. Vol. XXXIII. p. 564, (in an adult from hydatids.)

(15) I have seen this in several hemicephalic monsters—a similar state of the spinal cord occurs, however, without cleft of the spinal column, v. *Mery* in Mém. de l'Acad. des Sc. 1704. p. 29. — *Morgagni* Epist. anat. XX. p. 56.—*Anselin* in Journ. de Médec. Vol. XXXV. p. 336.—*Saxtorph* Gesammelte Schriften u. s. w. Vol. I. p. 477. 4to. Kopenh. 1803.— *G. Lieber* D. Monstri molæ specimen præ se ferentis descriptio anatom. 4to. Berol. 1821, with plates, (the brain and spinal cord were entirely wanting, and there was merely a membranous bag in place of bone, the lymph contained in which, had either become absorbed by remaining in spirits of wine, or had flowed out during the examination.)

(16) *P. Frank* De cur. hom. morb. L. VI. Part I. p. 215. — *Brewerton* in Edinb. med. and surg. Journ. Vol. XVII. p. 378, (two cysts in the lumbar region lying close to each other, and opening by two apertures into the spinal canal.)

(17) The size of the cleft in the spine varies very considerably; generally several of the vertebræ are open, more rarely but one, or there is found only a small round hole in one bone, by which the tumour is connected with the spinal canal. v. *Ruysch*, Observat. anat. Chir. Obs. XXXVI. and *Acrel.* Those cases are also equally rare, in which, with the bones healthy, the tumour projects between the vertebræ. v. *Mohrenheim* and *Portal.*

(18) In many cases the tumour falls together, as it were cicatrizes, the skin thickens, inflames, adheres, is discoloured by coagulated blood, &c. — In other cases it is tense, and varies from the size of a nut to that of a child's head, or thereabouts, and expands to bursting or mortification.

(19) This arises from the circumstance, that at the period of the usual origin of this disease, the spinal canal at this part is constantly widened; and that in the later origin and situation of the water within the cavity of the arachnoid, the lower end of the sheath comprises the dura mater.

(20) Although by no means so rare as *Ruysch* and *Morgagni*, Epist. XII. 9, have supposed. Sometimes the tumour includes the lower end of the spinal canal, which is often deficient at this part.—I have seen this twice, in calves without tails.—*van Doeveren* also observed it in a calf. v. Specimen Observ. acad. 4to. L. B. 1765, pl. 4, fig. 2.—*Vrolik* also saw it in a child, with other malformations. v. Mémoires sur quelques sujets interessans d'Anatomie et de Physiol. Amsterd. 1822, p. 76 and 77, with plates.

(21) The dropsy of the cervical portion of the spinal marrow is then only a process from that of the brain, and the degenerated brain is immediately connected with the destroyed or diseased origin of the spinal marrow, which is sometimes

perfectly normal below. In this simultaneous destruction of the cervical portion of the spinal marrow, whence the nerves of the neck arise, lies, according to my opinion, the cause of the frequent want, or the extreme shortness of the neck in hemicephalic monsters. This is confirmed by the fact, that in those hemicephalics, in which merely the brain, or only the cerebrum, is diseased or destroyed, the neck is always proportionally long.

(22) Such observations are described by *Zwinger* in Ephem. Acad. N. C. Cent. VII. Obs. 29. — *Linck* in Act. Nat. Cur. Vol. I. Obs. 74. — *Huermann* Vermischte Bemerkungen u. Untersuchungen a. d. ausübend. Arzneiwiss. Vol. I. p. 304.—*Acrel, Palletta, Vaccà-Berlinghieri* and *Urquhart.*

(23) For instance, *Morgagni* Adv. anat. VI. Obs. 14, p. 18; and *Santorini, ib.*, (as large in an adult as to admit the point of the little finger.)—*Portal* in Mém. de l'Acad. de Sc. 1722, p. 481, (in an adult); and Cours d'Anat. Méd. Vol. IV. p. 66, (in a new-born child); and p. 118, (in an adult.) — Not merely in hemicephaly and hydrencephalocele have I found the upper part of the spinal cord very broad, hollow, and containing water; but also in hydrocephalic children; and in two calves with very large dropsical heads, the canal of the spinal cord was much expanded with water throughout its whole length. — *Gall's* observation of two lateral canals in the spinal cord, seems to me not to be entirely relied on. v. Anat. et physiol. du Système nerveux, p. 51.

(24) *P. Frank* De cur. hom. morbis. L. VI. Part I. p. 202, observed it twice. And I once found, in a dropsical person, portions of the spinal marrow swollen, and œdematous, some inches in length.

§ 247.

A vicious POSITION of the spinal marrow arises, in rare cases, from the already mentioned *hydrorrhachis*, so that the spinal marrow expanded by the water itself, or compressed by the collection of water between the membranes, is more or less protruded through the cleft in the spine, and thus a kind of RUPTURE OF THE SPINAL MARROW, *hernia medullæ spinalis*, is produced.[1] Those cases are more rare in which the spinal marrow deviates a little from its natural position in consequence of morbid destruction of its bony walls.[2] As to COLOUR, the spinal marrow varies sometimes in a similar manner as the brain, and in vices of texture it seldom exhibits the natural colour; we find it also, but rarely, however, discoloured without change of structure, for instance, yellow in jaundice.[3] More frequently is the CONSISTENCE of the spinal marrow irregular, inasmuch as it becomes SOFTENED, pulpy, even entirely broken up and mingled with blood,[3*] generally, or more commonly only in spots, in consequence of diseases which destroy its coherence, especially dropsy, suppuration, inflammation.[4] Or on the contrary, it becomes too FIRM and HARD; the latter we observe in a less degree, and with diminution of the circumference, in dorsal consumption, with thickening also in chronic inflammation of the organ.[5] In consequence of the protected situation of the spinal marrow, diminution of consistence does not give rise to VICES OF CONTINUITY, but these originate either in penetrating, cut, and thrust, and especially in gunshot wounds, or without such wounds in fracture and

dislocation of the vertebræ,[6] as well as also from mere extension and concussion.[7] In such cases the marrow sometimes protrudes largely through the opening in the *pia mater*. Small wounds of the spinal marrow may in rare cases even heal.[8]

(1) For instance, *Tulpius* in Observ. med. L. III. cap. 29 and 30.—*Apinus* in Ephem. Acad. Nat. Cur. Dec. III. Ann. IX. Obs. 180; and *Hochstetter.*—*Hoin* in Mémoires de l'Acad. de Dijon, Vol. II. — *Sandifort.* — *Mohrenheim* Beobachtungen verschied. chir. Vorfälle, Vol. I. p. 172. — *Palletta.* — *Moeckel*, fig. 3. — *Carus* Zur Lehre von Schwangerschaft und Geburt. Part I. p. 227. — I have found this dislocation in three instances. — More commonly protrusion of the spinal nerves is seen, which project far out of the spinal canal, and are lost on the walls of the tumour. — A few instances also have been found, in which, through a cleft in the bodies of the vertebræ, a part of the œsophagus had slipped into the vertebral canal, and displaced the spinal cord. v. *Lallemand* Observations pathologiques, p. 29, Paris, 1818, with plates; and *Geoffroy Saint-Hilaire* in Annales des Sciences naturelles, Vol. XIII. p. 246, March, 1828.

(2) *Ferro* De carie vertebrarum et medulla spinali libere in abdomine fluctuante historia in Nov. Act. Acad. Nat. Cur. Vol. VIII. p. 123.—*Lecat* Traité du mouvement musculaire, Vol. XXII. tab. 3. Berl. 1765.—*Phillips* in New London medic. Journal, Vol. I. Part II. p. 2. 1792; compare *Richter's* Chirurg. Biblioth. Vol. XV. p. 77.

(3) *Lobstein* on Kirrhonose in Compte rendu sur les travaux anatomiques, p. 53, and in Répert. général d'Anat. et de Physiol. etc. Vol. I. No. I. p. 143. pl. 4. Paris, 1826. Compare above § 39, note 2.

(3*) [Effusion of blood into the centre of the spinal cord opposite the last dorsal nerves, after violent exertion, death in thirty-seven days. v. Nouv. Bibl. Méd. Nov. 1829. T.]

(4) Ephem. Acad. Nat. Cur. Dec. II. Ann. VI. Obs. 58.—*Morgagni*, Epist. LXX. 5, (very soft in a person who died of scirrhus pylori.)—*J. P. Frank* De curand. hom. morb. L. II. p. 49, (as suppuration.)—*Gautier de Claubry* in Journ. gén. de Méd. par *Sédillot*. Vol. XXXII. June, p. 129.—*Portal* Cours d'Anat. méd. Vol. IV. p. 116, (in the right half.)—*Horn* in his Archiv f. medic. Erfahrung. 1815. Part V. p. 838, (pultaceous in a person who died of tabes dorsualis.)—*Esquirol* in *Leroux* Journ. de Médec. 1817, Vol. XXXIX. p. 424, (in many epileptic persons, especially the lower extremity.) — Dublin Transact. of the Association of Physicians, Vol. I. p. 1, (two cases which died of tetanus.)—*Georget* De la Folie, p. 492. Paris, 1820.—*Rostan* Recherches sur une maladie encore peu connue, qui a reçu le nom de ramollissement du Cerveau. Paris, 1820, (six examples.)—*Pinel* in *Magendie's* Journal de Physiol. Vol. I. No. 1, p. 54, (in two insane persons, the greater part dissolved.) — *Rullier, ib.* Vol. III. No. 2, p. 173. — *Harrison* in London med. and phys. Journ. Vol. XLIX. May, 1823, (two psoas abscesses communicated with the vertebral canal.) — *Ollivier*, cases 43–46, 48 and 50.— *Serres* in *Magendie's* Journ. de Physiologie, Vol. V. No. 3, p. 254; and in Archives générales de Médec. August, 1825, (the anterior columns of the spinal cord in a paraplegic patient.)—*Hertzberg* in *Rust's* Magazin f. d. ges. Heilk. Vol. XX. Part II. p. 376, (the lower half.) — *Ahlberg* and *A. Retzius* in Ars-Berättelse om Svenska Läkare-Sällskapets Arbeten, lemnad af *Ekström*, 1825, (in a man who had paralysis without loss of sensation in the feet, the anterior columns were softened in their lower third.) — *Royer Collard*, v. *Magendie's* Journal de Physiologie, Vol. III. No. 2, p. 157, April, 1823, (the anterior columns of the spinal marrow of a man whose legs had been motionless and bent up seven years, but in which there was still sensation.)—*Louis* Mémoires ou Recherches anat. pathol. Paris, 1826, p. 410, (several cases with caries of the spine.)—*Jeffreys* in London medical and physical Journal, July, 1826, (three cases of softening after fracture of the vertebræ.) — *Fuchs*, communicated by *Locher Balber*, in *Hecker's* Liter. Annalen d. ges. Heilk. Oct. 1826, p. 244, (pultaceous in two children who died of hydrophobia.)—*Vering* in *Rust's* Magazin, Vol. XXII. Part II. p. 562, (some time after the injury.) — *Thom. Molison* in Transact. of the med. chir. Soc. of Edinburgh, Vol. III. Part I. p. 173,

(in a man with aneurysma aortæ.)—*Gendrin* Histoire Anatomique des Inflammations, case 150.—*Venables* Dissect. II. p. 99, quoted by *v. Stosch* Versuch einer Pathologie u. Therapie des Diabetes mellitus. 8vo. Berl. 1828, p. 104, (in a diabetic person, softened and hardened here and there.)—Nouvelle Biblioth. Aug. 1823, (with caries and tubercles in the vertebræ.)—*Abercrombie*, case 126—129, p. 341 and 346.—I have several times observed softening of the spinal marrow to a high degree, especially accompanying caries of the spine, although twice also without it; the first case was a person affected with scurvy, who had been very much chilled in bathing, and became paraplegic; the other was a man of whom I could learn nothing more than that he had become paraplegic. [*Hart* in Dublin Hosp. Rep. Vol. V. p. 522; an abscess in the centre of the spinal marrow of a child extending throughout the whole dorsal portion. T.] This disease also occurs in animals, viz. in epizoetics, in the dorsal disease of horses, in tubercular disease, and from unknown cause, with paralysis of the legs. *Sagar* thus found it in a disease among sheep, v. Auserles. Beiträge zur Thierarzneik. Vol. I. p. 49; in horses, v. *Dupuy* in Journ. gén. de Médec. 1820; and in a rabid cow, Jan. 1821, Vol. LXXV. p. 82. — Compare also *Lallemand* Recherches Anatom. pathol. sur l'Encephale et ses Dependances, (extremely distinct in the enlargements of the spinal marrow, especially in the lower, in horses.) — *Greve* Erfahrungen und Beobachtungen über die Krankheit. der Hausthiere, Vol. II. p. 6, (in a horse, to the length of four ells, and as thin as milk.) — *Barthelemy*, v. Archives gén. de Médec. Aug, 1823, (in a rabid horse.)—*Bouley* in Recueil de Médec. vétérin. Vol. I. p. 28, (the anterior column of the spinal marrow in a horse, with palsy of the hind leg.)

(5) The ancients called this in part scirrhus.—*Portal*, (the cervical portion of the cord as hard as cartilage.)— Lond. Med. Obs. and Inq. Vol. III. (in the Count de Lordat, the cervical portion swollen and hardened.) — *Clot* Recherches et Observations sur le Spinitis. Montpell. 1820, (the cervical portion swollen and of cartilaginous firmness.) — *Bergamaschi* Sulla Mielitide stenica, &c. Pavia, 1820, (second, fourth, and eighth cases.) —*Velpeau* in Revue Médic. franç. et étrang. Vol. II. p. 247, (the lumbar enlargement like cartilage.) — In epileptic and insane persons, the spinal cord has been found several times too hard. v. *Esquirol* and *Pinel.* — *Ollivier*, p. 304. — *Gendrin*, Vol. II. p. 137, case 150, (hardened and softened in spots.)

(6) On injuries of the spinal cord and its membranes, I refer to the writers on surgery and forensic medicine, also to *Ollivier* and *Abercrombie*; *Autenrieth* D. Observ. de læsione medullæ spinalis. Tubingæ,1811.—*Palletta* Exercitationes pathologicæ, p. 231, and *Casper* Ueber die Verlezzungen des Ruckenmarks und ihr Lethalitätsverhältniss in *Rust's* Magazin, Vol. XIV. Part III. und besonders abgedruckt. Berlin, 1823. I have myself seen the spinal marrow smashed, in three cases, in which workmen had fallen from great heights, and the vertebræ of the neck were broken, and, in one instance, half torn through by a bullet. In the account of the morbid examinations kept at the Breslau Medical College, I have also found three cases of injury of the spinal marrow, in one of which, a bullet, passing through the dorsal portion of the spine, had torn the spinal cord through; in the second, a bullet had torn through one vertebral artery, and the whole of the spinal marrow in the first vertebra; and in the third case, the bullet had so torn the cord in the lower part of the back, that only one little nervous band connected the upper and lower portions: in all these cases death ensued either immediately, or very soon after, but in the latter, the man lived half a year. Sometimes, from a fall or from a blow, &c. we find the spinal cord torn through, either with or without rupture of the membranes, v. *E. Home*, Philos. Trans. 1814.—*H. Cline*, in the case in which he first removed by operation a part of the broken vertebra. — *Hayward*, in New England Journ. of Medicine and Surgery, Boston, Jan. 1815, Vol. IV. No. 1, (in the dorsal region, the man died on the nineteenth day.) — *Rust*, in Magaz. d. ges. Heilk. Vol. XIII. Part III. p. 551, (cut through, as it were, by the fracture of several vertebræ.) —*Swan*, Observ. on the Anatomy, Physiology, and Pathology of the Nervous System, Chap. 8, London, 1822, (fracture of the second dorsal vertebra, with division of the spinal marrow, fatal on the fourteenth day.)—*Wallace* in Dublin

Transactions of the Association of Physicians, Vol. V. 1828, (from a fall out of window, fracture of the third and fourth dorsal vertebræ, and the extremities of the spinal marrow, half an inch apart; died on the ninth day.)

(7) It is thought that in partus Agrippinus, if the feet are violently pulled, death often ensues by rupture of the spinal marrow, which is probable, as midwives and bunglers have pulled off even the head. One person, who behaved horribly by seizing hold of the neck, tore through the medulla oblongata without injuring the bones. v. *G. Bonsdorf* resp. *Wegelius* De anatomicam Veneficii arsenico peracti investigationem sistens. 4to. Abo, 1817. — By a fall on the head the spinal marrow was torn from the skull. v. *von Walther* in his and *v. Gräfe's* Journ. f. Chirurg. Vol. III. Part II. p. 199. — The spinal marrow was torn through in a child which was run over, although it lived thirteen months after, and died of the croup. v. *C. Bell*, Observations on Injuries of the spine, &c. 4to. London, 1824.

(8) The experiments on animals by *Arnemann*. v. Versuche über das Gehirn und R. M. p. 195, von *Prevost*, *Larrey* and *Flourens*. v. *Heusinger's* Zeitschrift für die organische Physik. Vol. II. Part III. gives instances of cicatrization of wounds of the spinal marrow; perhaps here also belong the cases of the human subject mentioned by *Morgagni*, Epist. LIII. 23, and *Boyer* Traité des Maladies chirurgicales, Vol. VII. p. 9.

§ 248.

VICES OF TEXTURE of the spinal marrow are generally similar to those of the brain. In most instances, INFLAMMATION OF THE SPINAL MARROW, *myelitis*,[1] which occurs partly as consequence of injuries and diseases of the vertebræ and their ligaments, partly as an idiopathic disease, in greater or less connexion with its membranes, gives rise to them. The seeming apoplectic effusion of blood in the tissue of the spinal marrow itself, frequently arising from congestion of blood, and from morbid irritation, must be distinguished from this active inflammation of the spinal marrow.[2] The diseases in which the spinal marrow exhibits, especially, the traces of existing irritation and inflammation are, many fevers[3] and eruptive diseases,[4] hydrophobia,[5] painter's colic,[6] epilepsy,[7] trismus,[8] tetanus,[9] St. Vitus's dance,[10] &c. The spinal marrow in such cases often exhibits a rosy-red colour with some dusky spots and streaks, enlargement of the minute vessels, injection of its membranes, oftentimes distinct swelling, and always more or less variation from its usual consistence, namely, hardening or more commonly softening, or complete dissolution into a discoloured fluid frequently mingled with blood. More rarely does the inflammation of the spinal marrow appear to run into true suppuration;[11] small abscesses even have been found in it.[12] Still more unfrequently does gangrenous destruction occur on the spinal marrow; never indeed primarily, but only in defined spots: the deposition of lime on it does not seem ever to take place. SPURIOUS FORMATIONS in the spinal marrow are very uncommon, viz. tumours, tubercles, and sarcoms.[13] In a few instances, only, have extraneous bodies been observed to remain for some time in this organ.[14]

(1) Called also *Rhachialgia, Rhachialgitis, Spinitis, Notaëomyelitis,* &c.; and perhaps most significantly *Rhachiomyelitis.* v. *Galenus* De locis affect. Cap. VI.—*Allen* Synopsis univ. Med. Part I. p. 165.—*J. P. Frank* Oratio de vertebralis columnæ in morbis dignitate. Paviæ, 1791, and De curand. hom. morbis. L. II. § 141, ff. p. 48.—*Haefner* D. de inflammatione medullæ spinalis. Marburg, 1799.—*Bergamaschi* Osserv. sulla inflammazione della spinale midolla, &c. 4to. Pavia, 1810.—*Brera* Della Rachialgite cenni patologici in Atti dell' Academia Italiana di Scienze, Lit. e Art., Vol. I. Part I. p. 246, Livorno, 1810; and *Brera* and *Harles,* Ueber die Entzündung des R. M., from the 2d Vol. of *Harles's* Jahrb. de Med. und Chir. abgedruckt. Nürnb. 1814.—*Niel* Sur le Spinitis in *Corvisart's* Journ. de Médec. 1812.—*Spangenberg* in *Horn's* Archiv f. med. Erfahrung. 1813, p. 4.—*Macari* in Annales de la Soc. de Médec. de Montpellier, Vol. XX. p. 5.—*Ronander* in Svenska Läkare-Sällskapets Handlingar. Vol. VI. p. 224, (a case of inflammation of the brain and spinal cord in a man.)—*Funk* Die Rückenmarksentzündung, inaugural Treatise, 2d edit. 8vo. Bamberg, 1819, with additions. Bamberg, 1825.—*Klohs* D. de myelitide, Halæ, 1820.—*Clot* Recherches et Observations sur le Spinitis. Montpellier, 1820.—*Pinel* in *Magendie's* Journal de Physiologie, Vol. I. No. I. p. 54.—*Nybläus* in Abhandl. der K. Schwed. Akademie, Jahrg. 1822, Part II. p. 343.—*Sonnenkalb* in der Dresdner Zeitschrift für Natur-und Heilkunde, 1823, Vol. III. Part I. p. 65—110.—*L. Wolf* Beobachtung einer chronischen Entzündung des R. M. mit ungewöhnlichem Ausgange, nebst Bemerkungen darüber. Hamburg, 1824.—*Friederich* D. de myelitide. 8vo. Berol. 1825.—*Graf* De Myelitidis Nosographia. 4to. Regiom, 1823, (with two cases of his own.)—*Machiewitz* Observationes de rachialgitide, pneumoniam et præsertim pleuritidem dorsalem mentiente in Comment. Soc. phys. med. Mosquens, Vol. III. Part II. p. 158, Mosquæ, 1825, (three cases.)—A case of inflammation of the spinal marrow, with enlargement and softening from rupture of four nerves of the brachial plexus, is described by *Flaubert* in Répert. gén. d'Anat. et de Physiol. pathologiques, Vol. III. Part 1. p. 102, ff., 1827.—*Gassaud* in Journal univ. des Scienc. medic. April, 1828.—Compare also *Reydellet* in Diction. des Scienc. médical. Vol. XXXIII. p. 538, *Rachetti, Ollivier* and *Abercrombie.*

(2) I have twice seen this in the cervial region of old persons: in one case the blood was in little spots in the spinal marrow; in the other, in a spot where the marrow was softened and torn, a lump of blood was formed almost as big as a pea; in both cases there was also effusion of blood between the membranes, and the vertebral veins very much expanded.—*Home,* in Phil. Trans. 1814, found blood effused within the spinal marrow from external injury.—*Ollivier,* p. 241.—*Jones* saw great injection of the surface of the spinal marrow with diminished sensation. v. Edinb. med. and surg. Journ. Vol. XXI. p. 81 and 83.

(3) *Chaussier, Girard* (in oxen and sheep.) *Ollivier,* p. 375, in the latter. I myself have seen, in a few cases of typhus, the pia mater and adjacent spinal cord strongly injected; similar cases are also described by *Brera* and *Rachetti.*

(4) I have seen this very distinctly in a person aged twenty-two years, who died of malignant small-pox.

(5) *Matthey* in Journ. gén. de Méd. Vol. XLIV. p. 279.—*Johnson* in London med. chir. Journal and Review, October, 1827.—*Clot.*—*Trolliet* Nouv. Traité de rage, etc. v. *Ollivier,* p. 373.—*Meniere* in Archiv. général. de Médec. Decemb. 1828.—In oxen and horses, *Dupuy* and *Barthelemy.*

(6) *Astruc* and *Sauvages* were previously of this opinion, which has been confirmed by recent observations. v. *B. Palais* Traité pratique sur la colique metallique, etc. Paris, 1825, and *Renauldin* in Journ. Compl. du Dict. des Scienc. Méd. Vol. XXII. p. 247.

(7) The older writers, for instance, *Fr. Hoffmann,* had already derived convulsions from diseases of the spinal marrow, and *Harles* mentions an epilepsia spinalis.—*Puchelt* also Die individuelle constitution und ihr Einfluss auf die Entstehung und den charakter der Krankheiten, Leipz. 1823, an epilepsy of the spinal marrow.—*Esquirol,* v. *Leroux* Journ. de Médec. 1817, Vol. XXXIX. p. 424, frequently found the spinal marrow in a state of irritation in epileptic persons. *Swan* also found the spinal membranes inflamed in a child who died of convulsions, and adherent

in a case of epilepsy. v. Observations on some points relating to the anatomy, physiology, and pathology of the nervous System, London, 1822, Chap. 7.

(8) *J. Thomson* found in all the negro children who died of trismus, in Jamaica, the spinal cord and its membranes inflamed. v. Edinb. med. and surg. Journ. No. LVII. 1818, Nov.—*d'Outrepont* also found the same in five children. v. Abhandl. und Beiträge Geburtshülfl. Inhalts, Part I. p. 242. Würzburg, 1822.

(9) It is well known that heretofore *Galen, Willis, Fr. Hoffmann, Burserius,* and subsequently *Marcus* and many others, derived tetanus from affections of the spinal marrow; and indeed, at other times inflammation of the spinal marrow and tetanus have been considered identical. Tetanus has been seen to arise after violent concussion of the spinal cord, v. *Stoll* Ratio Medendi, Vol. I. p. 298, and *J. P. Frank*, p. 276. Traces of violent irritation and inflammation were found in tetanus by *Brera* Prospetto di risultamenti ottenuti nella clinica medica dell' Università di Padova nell' Anno 1816 e 1817.—*Reid* in Dublin Transact. of the Association of Physicians, etc. Vol. I. p. 1, and On the nature and treatment of Tetanus and Hydrophobia. Dublin, 1817.—*Bergamaschi* Sulla mielitide stenica, ossia inflammazione della midolla spinale e sul Tetano, loro identità, metodo di cura e malattie secondarie che ne derivano, Osservazioni. Pavia 1820.—*Duncan*, jun. in Edin. med. and surg. Journal, Vol. XVII. p. 332.—*Parent-Duchatelet* and *Martinet* Recherches sur la Meningitis, etc. Paris, 1821. — *Speranza* in Anno clinico medico. Parma. 1823-24.—*Pelletier* in Revue médicale franç. et étrangère, 1827, Nov. and Decemb.—*Blasius* in *Rust's* Magazin f. die gesammte Heilk. Vol. XXVII. Part I. p. 53.

(10) *Harles's*, p. 41, 57, 58.

(11) In a case of pædarthrocacy, I found the pia mater of the spinal cord inflamed, thickened and ulcerated at the diseased part; in fractures of the vertebræ it has also been seen inflamed and suppurating. v. *Jeffreys,* in London med. and phys. Journ. July, 1826.—Destruction of a portion of the spinal marrow by suppuration in psoas abscess, which had been effused into the spinal canal, is related by *Jackson.* v. Neue Samml. auserl. Abhandl. z. Gebr. prakt. Aerzte, Vol. VI. Part III. No. 1.—Spontaneous suppuration was seen by *Brera* in many cases; it was completely destroyed, together with the seventh dorsal vertebra, by suppuration in a case of *Heckscher's.* v. *Wolf.* p. 142.

(12) *Velpeau* in Revue médic. franç. et étrang. Vol. II. p. 247, (an abscess in the right column of the cervical portion of the cord, three inches long and a couple of lines broad, and a smaller one in the left column.)—*Gendrin.*

(13) *Phillips* in New London med. Journal, 1792, Vol. I. p. 144, (a medullary sarcom of the spinal marrow and its membranes.)—*Loewenhard* D. de myelophthisi chronica vera et notha, 8vo. Berl. 1817, with plates, (a sarcomatous tumour.) — *Cerutti* in Pathol. anat. Museum, Vol. I. Part II. p. 23, pl. 10, (a hard yellowish tumour in the cervical portion, as large as a pigeon's egg, indeed a tubercle.)—*Sonnenkalb* in Dresdner Zeitschrift für Natur-u. Heilk. Vol. III. Part I. (is the last case.)—*Wolf,* p. 20, (a large medullary sarcom, which had projected from without, and formed two tumours on the spine.)—*Velpeau* in Archives général. de Médec. 1825, Jan. (a flat yellowish red growth on the front of the spinal marrow, between the sixth cervical and third dorsal vertebræ.)

(14) The broken point of a dagger was seen by *Cuvilliers,* and communicated by *Ferrein* in Mém. de l'Acad. des Sc. 1743, Obs. 9, Collect. acad. Vol. IX. in 4to. p. 233. A small shot in the spinal marrow of a bird. v. Ephem. Acad. Nat. Cur. Dec. II. Ann. X. Obs. 34.

THIRD CHAPTER.

Of the Nerves.

§ 249.

The NERVES,[1] although generally subjected to few vices of structure, exhibit no less, in rare cases, VARIETIES in respect to

their number, origin, course, connexion, &c., of which we shall here notice the most important. The TOTAL WANT OF NERVES never seems to occur in monsters, however imperfect they may be, as the organs which are formed always possess some nerves.[2] Frequently, however, is there a WANT OF SINGLE OR SEVERAL NERVES, as, not merely in monsters of which certain parts are deficient, the nerves which are naturally appropriated to or are connected with them are totally or partially missed,[3] but even in those which are present and are imperfectly formed, as in deficiency of the mass of muscles of the limbs, the nerves are deficient.[4] Most frequently are the ANTERIOR NERVES OF THE BRAIN deficient, and principally indeed in those monsters with imperfect formation of the nose, the eyes, and the face;[5] we also see, especially in such monsters, the OLFACTORY NERVES deficient;[6] this, however, occurs also, in rare instances, in otherwise well-formed persons.[7] The OPTIC NERVES stand also in a similar relation to the eyes, so that when these are entirely deficient, both optic nerves are also absent;[8] but if the eye on one side only be wanting, the nerve on that side is alone deficient,[9] and also in cyclopic malformations, according as the consolidation of both eye-balls varies, so does that of the optic nerves into one.[10] VICES OF THE THIRD, FOURTH, AND SIXTH PAIRS OF NERVES, as well also as the FIRST BRANCH OF THE FIFTH PAIR, are also usually connected with the total want or the deformity of the eyes.[11] In one cyclopic monster with nearly total absence of the face, the FACIAL NERVE did not exist.[12] In very imperfect organs of hearing, the AUDITORY NERVE has been missed.[13] Where the tongue has been deficient, there has been noticed not merely deficiency of the LINGUAL BRANCH OF THE FIFTH PAIR OF NERVES, but also of the MUSCULAR LINGUAL NERVE.[14] The opposite vice or EXCESS OF NUMBER OF THE NERVES, occurs, when we notice, as is proper, the uncommon and too early division of a nerve into its branches, not, however, but with excess of the parts with which it is connected,[15] and this is then generally to a certain extent dependent on their form; thus, for instance, with a supernumerary vertebra we have a spinal nerve too many; a sixth finger, which is perfectly organized, has also an uncommon digital nerve, &c.; in double monsters, of which the head, belly, or limbs, are simultaneously consolidated of two, we find in their parts, according as they differ in the greater or less degree of their consolidation, the nerves either completely double or divided, or double and anastomosing at certain points, or lastly, double at their origin, but passing singly from their junction.[16] Lastly, the number of branches from

the sympathetic nerve going to different organs, has been, in diseases of the latter, observed to be diminished or increased.[17]

(1) Of the great number of writers on diseases of the nerves, as they are generally of little consequence for pathological anatomy, I notice only the following:—*Karl Oppert* D. de vitiis nervorum organicis. 4to. Berol. 1815.—*Jos. Swan*, A Dissertation on the Treatment of morbid local affections of the Nerves, London, 1820.—*P. J. Descot* Dissertation inaugurale sur les affections locales des nerfs, 4to. Paris, 1822, and since enlarged and published in 8vo. 1825.—On the varieties of the nerves, compare the manuals of *Sömmerring*, *Meckel*, *A. C. Bock* Die Rückenmarksnerven, u. s. w. Leipz. 1827, and *Dubrevil* in Ephém. Médic. de Montpellier, Vol. V. May, 1827.

(2) *Clarke's* case of total deficiency of the nervous system. v. Philos. Trans. 1793, Part II. p. 154–164, seems to me not to be relied on; it was probably not thoroughly dissected.

(3) Deficiency of the nerves is always in causal and connected proportion to malformation, because the formative principle seems to spring from them; thus, for instance, in acephalous monsters, not merely are the nerves of the head and the upper part of all the nerves, but also the tenth and eleventh pairs, and the frenic nerves, in rare cases, wanting when there is a distinct chest, lungs, and diaphragm. The number of spinal nerves depends on the vertebræ; hence, in acephalous and hemicephalous monsters with but few cervical vertebræ, in monsters with imperfect development of the hinder part of the spine, or even in otherwise perfectly formed men and animals, of which one or other vertebræ is deficient, one or several pairs of nerves are wanting. In monsters, of which the extremities are deficient or imperfect, the deficiency of the limbs is always connected with that of the nerves; thus in single fingers and toes, hand and foot, fore arm and leg, their nerves are also wanting; if the whole limb be deficient, so also is the brachial and lumbo-sacral plexus, and without any branches being given off, except those to the adjacent parts of the trunk; lastly, if with deficient arm the region of the shoulder be wanting, or below the one half of the pelvis, so the above-mentioned nervous plexuses are wanting, and there proceed from the vertebral holes merely some posterior threads to the muscles of the neck, and the undermost layer of the muscles of the back. In the not uncommon human monsters of which the radius of the fore arm and the thumb are deficient, the radial nerve terminates at the elbow-joint, or passes down merely as a single thin thread to the back of the hand. In a roe which had no fore legs, and of which the hind legs were much distorted, the obturator and crural nerves were wanting; but the ischiatic was large. v. *Serlo* D. Monstror. extremitatibus carentium exempla tria, p. 20. Berol. 1826. Lastly, in syren monsters sometimes, on the contrary, the ischiatic nerves are wanting, and are replaced by the anterior nerves.

(4) I have seen a case of this kind in one lower extremity.—*Meckel*, Handbuch der pathol. Anat. Vol. I. p. 173, found neither muscle nor nerve in the right lower extremity of an acephalous monster. The same was also noticed by *Breschet* on the right lower extremity, v. Med. chirurg. Trans. Vol. IX. p. 433, 1818, and by *Chaussier*, v. Bullet. de la Faculté de Médec. Vol. V. p. 405.—In a sheep, neither of the hind legs had either muscles or nerves. v. *Schroeder van der Kolk* Observat. anatom. pathol. et practici argumenti, Fasc. I. p. 9. Amstel. 1826. In accessory parts of monsters the nerves are frequently wanting; thus in a child, from the pit of whose stomach the arms and bones of a parasite, No. 2913 of Bresl. Mus., were produced, I could find no nerves; and they were also wanting in a calf, two geese, and several fowls, on the pelves of which supernumerary legs were attached; also in two instances of children with a sixth finger.—*Mayer* found in a parasite, on the breast of a child in which there were arms and bones, no other nerves than a delicate thread from the renal plexus. v. *von Grüfe* and *v. Walther's* Journ. d. Chir. 1827. Vol. X. Part I. p. 44.

(5) *Prochaska* found, in a cyclopic child, only the third, seventh, and eighth pairs of nerves. v. Abhandl. der böhm Gesellschaft. Jahrgang, 1788, p. 230, Prag. 1789.—*Carlisle* missed, in a lamb which had no face, not only the cere-

brum, but all the nerves, except the sixth and seventh pairs. v. Phil. Trans. 1801, Part I. p. 139—144. In a monstrous sheep without a face, and with a very small skull, and in which there was merely the hinder part of the brain, I observed that the first six pairs of nerves were totally wanting;—in a cyclopic dog, *Magendie* could not find the anterior five pairs of cerebral nerves, v. Journ. de Physiol. Vol. I. No. 4, p. 374;—and in a cyclopic lamb, *Meckel* could not find the first five pairs of nerves. v. Archiv für Anatomie u. Physiologie, 1826, No. 2, p. 263. — *Klinkosch* found in a child with one eye, without a nose, and with other deformity of the face, the first six pairs of the nerves deficient, the external branches of the fifth pair however existed, but the inner were wanting. v. Progr. quo anatomen partus capite monstroso proponit. 4to. Prag. 1766; rev. in Diss. med. select. Pragens. Vol. I. No. 12, p. 199. In a child without lungs, the second, third, fourth, and sixth pairs of nerves were deficient. v. *Malacarne* I. Sistemi del corpo umano e la reciproca influenza loro indagati, p. 90, 4to. Padova, 1803. In a child with deficiency of the right eye, the nose, and other malformation of the face, the first, fourth, and sixth nerves were totally wanting on the right side. v. *Rudolphi* in den Abhandlungen der Akademie d. Wissenschaften in Berlin für das Jahr 1814 u. 1815, p. 185. Berlin, 1818.—*Tiedemann* saw in a dog, without eyes, the second, third, fourth, and sixth pairs of nerves wanting. v. Zeitschrift für Physiol. Vol. I. Part I. p. 76. In monsters with very imperfect face, with deficient lower jaw, &c., some branches of the fifth pair are wanting, and also other nerves going to the face.

(6) This occurs in consequence of the olfactory nerves originating from the anterior part of the brain, which is often affected with water, and are at first hollow, and connected with the lateral ventricles. The olfactory nerves are not merely deficient in all cyclopic monsters which have no nose, or in its stead a kind of proboscis (I have found this confirmed in above a dozen monsters which I have examined), but also in those monsters which approach to cyclopy, by the eyes being too closely approximated, &c., v. the review of *Tiedemann*, in the Med. Chir. Zeit., 1825, No. 47, p. 408; and I have found it in a monstrous pig, No. 8812 of Bres. Mus.; further in other monsters, generally with distortion of the face, and of the nose in particular, as in two lambs, No. 2950 and 8021; also in a child, No. 8297 of this collection; and *Sömmerring*, in a child with only a single nostril, and a very small crybriform plate to the ethmoid bone. v. D. de basi encephali in *Ludwig's* Scriptores neurologici minores, Vol. II. p. 4; and also his Addenda to *Baillie*, p. 263, note 563; also sometimes in hemicephalous monsters, v. my Monstror. sex humanor. anat. et physiol. disquisitio, Francof. 1811, in the first, second, and, after repeated examination, also in the fourth case,—Selt. Beob. Part I. p. 13 and 47, and lastly, since that time, in some other hemicephala of the Bresl. collection.—*Patrix* Traité sur le cancer et sur les maladies des voies uterines, in Considérations générales, p. 18.—*C. E. Rudolphi* Monstror. trium præter naturam cum secundinis coalitorum disquisitio. 4to. Berol. 1829, with three plates (in three cases.)—Lastly, also, not very rarely in children with hare-lip and wolf's-mouth. v. *Lavagna* in Giornale di Medicina prat. da *Brera*, 1813, Vol. IV. Part III. — *Tiedemann*, in three cases. v. Zeitschrift für Physiologie, Vol. I. Part I. p. 72.—*Blandin* is said to have seen it in every case of wolf's-mouth, v. *von Froriep's* Notizen, Vol. XVI. p. 64, which, however, is by no means the case, as, in thirteen instances of wolf's-mouth with hare-lip, only in five was the olfactory nerve wanting, to wit, in No. 2328, 2888, 2891, 2898, and 2939 of my Verzeichn.

(7) *Valentin* in Eph. Acad. Nat. Cur. Ann. IX. and X. p. 429.—*Rosenmüller* De nervorum olfactorior. defectu Progr. zu *v. Martius* D. de lepra taurica. Lips. 1816, (there were found instead only two little eminences in the sylvian pits.) — *Rudolphi* v. *Blaurock* D. de nervorum sensuum defectu, p. 18, 8vo. Berol. 1828, (the right was entirely wanting, the left rudimentary where it lost itself in the arachnoides.)

(8) Compare note 5.—Further *Vicq d'Azyr* Mém. de la Soc. de Médec. 1776, p. 315. — *Weidele*, v. *Schmidt* in *Himly's* and *Schmidt's* Ophthalmologischer Bibliothek, 1805, Vol. III. Part I. p. 170.—*Osiander*, Handb. der Entbindungskunst, p. 520, Vol. I. Obs. 6, Tübingen, 1818, (in one kind of cyclops).—

Lobstein De nervi sympathetici hum. fabrica et usu, p. 53, 4to. Argentor. 1823. However, also in cyclops with tolerably well-formed eye no optic nerve has been found, viz. *Mery* in Mém. de l'Acad. des Sc. 1709. p. 18.—*Riviera* in *Brugnatelli's* Giorn. d. med. Pavia, 1795, Vol. I. p. 225. Even *Magendie* is said to have missed it, although the retina existed; one might doubt, that in these cases the nerve was very thin, and being torn through was overlooked: the absence of the optic nerve in one kind of cyclops is certain, it is described by *Ehrmann*, v. Répert. gén. d'Anatom. et de Phys. pathol. Vol. IV. Part I. p. 5.

(9) *Rudolphi.*

(10) There are, indeed, sometimes two optic nerves from the brain, which pass unnaturally close to each other, without decussating, to the great eye-ball, which they enter on either side, or they both unite in front in one common nerve for the single eye; or, but one nerve arises from the brain, and divides itself anteriorly into two branches for the two eye-balls lying in a single orbit, as *Rudolphi* saw in two cyclopic pigs. v. *Ruben*, Descriptio anatomica capitis fœtus equini cyclopici, p. 12, 4to. Berol. 1824, and *Meckel*, in one cyclopic sheep and two cyclopic pigs. v. Archiv für Anatomie und Physiologie, 1826, No. II. p. 247 and 248; or, and which is most commonly the case, there is only a single optic nerve from the brain, which, however, is very large at the hinder part, but passes singly to the brain. I found the latter the case in all the instances which have come under my observation, and only in No. 2344 was the optic nerve double at its origin. See, on the formation of the optic nerve in cyclops, *Tiedemann*, *Meckel*, and *J. Müller*, Zur vergleichenden Physiologie des Gesichtssinnes, p. 160. Leipz. 1826.

(11) Compare the cases quoted above at note 5.—In that of *Ehrmann's*, the third pair of nerves was, however, said to be present. I could not find the fourth pair in a cyclopic pig, No. 2346, which had all the other nerves except the olfactory; in a human cyclopic monster the fourth pair was deficient, and the sixth did not reach the orbit, but was connected merely with the sympathetic nerve. v. *Eller* and *Roloff*, in Hist. de l'Acad. des Sc. de Berlin, p. 112. 1754.

(12) *Tiedemann*, p. 87.

(13) I have seen this very rare case in a monstrous sheep. v. my Selt. Beob. Part I. p. 37.—*Valsalva* saw a hemicephalic monster which had no auditory nerve, nor any opening for it in the petrous bone; it is also curious that two other children of this woman were deaf. v. *Morgagni* Epist. XLVIII. 48; a similar case is also described by *Lobstein* De nervo sympathetico, p. 54, § 69.

(14) *Tiedemann.* p. 87 and 89.

(15) I have already remarked, at note 4, that accessory parts are not necessarily supplied with nerves.

(16) Several satisfactory cases, and plates of such cases, are given by *Barkow*, Monstra animalium duplicia per anatomen indagata, Vol. I. 4to. Leipz. 1828, who has taken much trouble in examining the nerves. The external examination of such monsters allows us to speak pretty certainly of their nerves; the nervi vagi and sympathici alone sometimes surprise us by their arrangement. In a monster which was double at the upper part, but single below, with two vertebræ lying close to each other, but perfectly distinct, the internal sympathetic nerves which were united beneath had no ganglia, because the spinal nerves on that side were deficient. v. *Gibson* in Phil. Trans. 1810, Part I. p. 123. In a janus-faced monster each face had its proper nerves from the two brains, &c.

(17) *Lobstein* De nervi sympathetici hum. fabr. usu et morbis Comm. § 152—154. 4to. Paris, 1823. I do not think it probable that there should be an actual increase or diminution in the number of branches, and I hardly need recall how very difficult such examinations are, and how easily they may be mistaken.

§ 250.

The NERVES sometimes exhibit variations from their normal SIZE, which may be either congenital or acquired. The CONGENITAL IRREGULAR SMALLNESS occurs not unfrequently, and

is very often connected with morbid softening, colouring, and structure, and seems to originate oftentimes in the total absence or great imperfection of the organ to which the nerves belong.[1] In hemicephaly, hydrencephalocele, and internal dropsy of the head, the cerebral nerves, so long as they remain within the cavity of the skull, are very thin, as are the spinal nerves in *spina bifida* at the diseased spot. More frequent is the ACQUIRED and later occurring DIMINUTION, or ATROPHY of the nerves, which but rarely, and only in a slight degree, participates in the general consumption of the body,[2] and appears to stand in an equally imperfect relation to paralysis;[3] the organs of sense, however, seem to form an exception, as they waste, shorten, lengthen, &c., both as cause and consequence of diseases of the organs of sense;[4] this has been observed most commonly and most completely in the optic nerves, of which sometimes only the part in front of the *chiasma*, often also the cerebral part of the nerve on the opposite or upon the same side, or lastly, on both sides, with or without optic beds and quadrigeminal bodies, have been found atrophic.[5] Not unfrequently wasting of one or several nerves originates in pressure, arising from swellings of various kinds at their origins;[6] so also the nerves within the skull and the spine are compressed less severely by collections of water, by abscesses, extravasation of blood, and other causes, and external to these cavities by various kinds of swellings, dislocated bones, &c. In many instances the causes of atrophy in certain nerves are more obscure.[7] The opposite vice, the IRREGULAR INCREASED SIZE OF THE NERVES, is rarely congenital,[8] but usually occurs later in various diseases, as inflammation, dropsy, cancer; in such cases it is naturally confined to single nerves, but is then sometimes so considerable, that the nerves exhibit a thickness three or four-fold greater than usual.[9]

(1) In a child without eyes, No. 2888 of my Verzeich., I found the second, third, fourth, and sixth pairs of nerves, together with the first branch of the fifth pair, slender, withered, yellowish grey, and almost without nervous matter. In another monster, No. 8297 of the Mus., with deficient eyes, nose, and malformed face, the nerves, from the seventh to the eighth pair inclusive, were remarkably small.—A monstrous sheep without a face, No. 8021 of the Mus., with deficient olfactory nerves, the following seven pairs very thin, and the right optic at the same time flattened. — A similar lamb, No. 8020, had the olfactory and optic nerves not thicker than a hair, and without any nervous matter; the following four pairs also thin, but containing some nervous matter.—In two children, a dog, and two calves, which were born with small and very imperfect eyes, I found the optic nerves, and in part also the optic beds, too small. v. No. 2342, 2343, 3232, 3233, 8267, 8363, 8364, and 8603, of Bresl. Mus. — In a cyclopic sheep without a tongue, I found the fifth, ninth, and twelfth pairs of nerves very thin. v. my Selt. Beob. Part I. p. 37. — In a human monster, No. 2885, the optic nerves without nervous matter and tubular. — In a monstrous pig, with a disposition to cyclopy, No. 8812, the fifth pair was too small; this was also the case with a

child which had no lower jaw; and also a similar child, all the lingual nerves. v. Selt. Beob. Part II. p. 168. — In a similar monstrous sheep, No. 8022, the third portion of the fifth pair was remarkably small, discoloured, and wanting nervous matter.—In some cases of hare-lip, and especially No. 2329 and 2896 of my Verzeich., I found the olfactory nerves too small.—In monsters which are entirely limbless, or have the limbs too small, the proper nerves to these are too small, as I have seen in several instances.—*Dumeril* observed the same in Marco Catozze, whose limbs, excepting the hands and feet, were deficient. v. Bullet. de la Soc. philomath. Vol. III. p. 122.

(2) *Desmoulins* in *de Blainville's* Journ. de Physiq. etc. p. 166, Feb. 1821, especially observes, that the nerves waste merely in the wasting of old persons, but not in young people; this is generally correct, although it has appeared to me, in some cases, as if the nerves, in young persons who had died of tabes, were sometimes dryer, that is, contained less fat and serum. Whether they were also thin I could not determine, on account of the great relative variation which naturally exists in the bulk of the nerves of different individuals.—I have never, however, found them remarkably thin in such bodies.

(3) In hemiplegic and paraplegic persons, the nerves of the paralytic parts are very rarely found thinner than in those which can be moved voluntarily.—Even if the paralysis have existed very long, and have occurred in very early youth, the nerves are sometimes apparently healthy. v. one such case in my Selt. Beob. Part II. p. 32.—It however appeared to me, in another case, in which, from earliest childhood, one leg was shorter and more slender than the other, as if its nerves were also more slender than those of the healthy foot, as was very natural. Sometimes also, in tabes dorsalis, the dorsal nerves are somewhat wasted.—*Koreff* found, in one such case, the anterior roots of the nerves in a high degree atrophic. v. *Magendie's* Journ. de Physiol. Vol. IV. p. 372. Oct. 1824.

(4) The cause is sometimes in the brain and nerves; sometimes, on the contrary, on the organs of the senses. In a child which died of water in the head, the olfactory nerves were too thin, brown, and hard. v. *Jeffray* in London Med. Repos. p. 278, April, 1822.—The auditory nerves have also been seen atrophic in deaf persons. v. *Fr. Hoffmann* D. de auditus difficultate, § 12, (in a dog which was deaf.)—*J. Haighton*, in Mem. of the Medic. Soc. of London, 1792, Vol. III. p. 1.—*Itard*, in a deaf and dumb person. v. Traité des maladies de l'oreille. Paris, 1821.—In the body of an old woman, I found the left auditory nerve of a yellow colour, and much thinner than the right. I could not ascertain whether the woman was deaf, though probably she was, as the membrane of the drum was ossified, and the cavity of the drum and labyrinth filled with a thick reddish jelly.

(5) Compare the works on decussation of the optic nerves, and *Vrolik* in Mémoires sur quelques sujets intéressans d'Anat. et de Physiologie. trad. du Holl. par *Fallot*, Mémoire I. 4to. Amsterd. 1822.—*Lieutaud* Histor. anat. med. Lib. III. Obs. 188—191, tab. 2, p. 367.—Wasting of the optic portion alone I have seen in four cases;—further, *Morgagni* in several. v. Epist. anat. med. and De sed. et caus. morbor. Epist. XIII. 9 and 10; Epist. II. 30; Epist. LXIII. 6.—*Isenflamm* Versuch einiger prakt. Anmerkungen über die Nerven. Erlang. 1774, § 58, p. 170.—*Michaelis* Ueber die Durchkreuzung der Sehnerven in *Grosse's* Magazin zur Naturgeschichte des Menschen, Vol. II. Part I. p. 149; und als besondere Schrift. Halle, 1790.—*Wenzel* De penitior. cerebri struct. p. 116, 119, and 120.—*Beer* Lehre von den Augenkrankheiten. Vol. II. p. 50. Wien, 1792, (in all cases, in which one eye was destroyed by inflammation and suppuration.)—*Vrolik*, p. 14, pl. 2, &c.—On simultaneous atrophy of the cerebral portion of the nerve of the opposite side, v. *Valsalva* in *Morgagni.*—*Sömmerring* and *Nöthig* De decussatione nervorum opticorum. Mogunt. 1780, (also several cases of animals.)—*Billmann* in *Blumenbach's* medic. Biblioth. Vol. II. Part II. p. 391, (in a dog.) *J. G. Walter* von der Einsaugung und der Durchkreuzung der Sehnerven, Berl. 1794, (in three cases.)—*Michaelis*, (in several cases.)—*Ackermann* in *Blumenbach's* medic. Biblioth. Vol. III. Part II.—*Rosenthal* D. de oculi quibusdam partibus. Gryphiæ, 1801, (in a horse and a jackdaw.)—*Wenzel*, p. 115.—*Caldani* Opusc. anat. p. 35, Patav. 1803.—*Gallereux.* v. *Sédillot's* Journ. gén. de Médecine,

Vol. L. No. 216, p. 880. Aug. 1814.—*Ebel* and *Clossius*, (in horses.) v. *Sömmerring's* Addenda to *Baillie*, p. 178, note 380.—*Magendie* in Journ. de Physiol. expérim. Vol. III. No. 4, p. 376, 1823.—*Rudolphi* Grundriss der Physiol. Vol. II. Part I. p. 220.—I have also seen two cases of this kind, one in a man and the other in an owl which had been blinded by a shot in the eye.—Atrophy of the optic nerve on the same side as the blind eye, throughout its whole length back to the brain, was seen by *Vesalius* De corp. hum. fabrica. L. IV. c. 4.—*Cæsalpinus*, *Rolfinck*, *Cheselden* and *Santorinus*. v. *Morgagni*, Epist. XIII. 7.—*Heiland* in Ephem. Acad. Nat. Cur. Dec. III. Ann. VII. Obs. 157.—*Meckel* in *Haller's* Grundriss der Physiologie, p. 386.—*Caldani*, p. 33 and 36; and in Mem. della Soc. Ital. Vol. XII. Part II. p. 27; and my Selt. Beob. Part II. p. 89.—A case in which both portions of the brain were wasted, in consequence of blindness of one eye, is described by *Wenzel*, p. 114. Cases also have been several times observed in which both eyes were blind, or both optic nerves throughout their whole length, together with the optic beds, were atrophic. v. *Walter*, p. 96.—*Vrolik*, (in a girl of fourteen years.)—*Biermayer* Mus. anat. path. p. 134, No. 564. Vindob. 1816; and my Verzeichn. No. 2350. In one such case it is said, that the optic portion of the nerve of the eye which was perfect, was atrophic, and that of the blind eye was natural. v. *Magendie's* Journ. de Phys. Vol. VIII. No. 1, p. 33.—On this point there is still much obscurity, and the contrary opinions seem to depend on this, that the disease originates sometimes from the eye, sometimes from the brain, and also on one or both sides; that it is sometimes a mere nervous disease, sometimes an inflammatory state, or disturbed nourishment of the eye; and that the course of the disease in men and animals is different. In the former it appears that the destruction of one eye produces consequent atrophy of the nerve much later than in beasts and birds. v. *Magendie*, Vol. III. No. 4, p. 376. We also perhaps find a difference between man and different animals in reference to the propagation of the disease to the opposite side.

(6) *Otto* D. de morbis ab intumescentia et pressione nervorum per foramina ossium egredientium. Erford. 1799. Wasting of the olfactory nerve, without loss of smell, was seen by *Mery*. v. Progrès de la Médec. 1697.—*Loder* Progr. Observatio tumoris scirrhosi in basi cranii reperti. Jenæ, 1799, with plates.—*Sömmerring* on *Baillie*, p. 263; and Addenda to *Baillie*, p. 177, note 379.—*Wenzel* De penit. cerebri struct. p. 104, (second case.)—*J. Ward* in London medical Repository, Vol. XX. p. 217, September, 1823.—*J. F. Meckel* in D. Archiv f. d. Physiol. Vol. III. p. 196.—*Béclard* in *Magendie's* Journ. de Physiol. Vol. V. No. 1 and 2, p. 17; and myself in three cases, v. Selt. Beob. Part II. p. 89 and 90. Since then also in one case from medullary sarcom of the eye and nose. Compression of the optic nerve arises from aneurysm of the carotid arteries near the Turkish saddle, from swelling of the appendage of the brain. v. *Rullier* in Archives générales de Médecine, p. 302. October, 1823. From a malformed clinoid process; v. *Sömmerring's* Addenda to *Baillie*, p. 264, and from other tumours. Compare *Boneti* Sepulchret. anat. Lib. I. Sect. XVI. Obs. 1, 2, 10.—*Blegny* Zodiac. Gallic. Obs. 14, p. 81, (by a bean-shaped bony concretion.)—*Paw* Obs. anat. rarior. II. p. 5, (hydatid.)—*T. Plater* Observationum, Vol. I. Lib. III. p. 102. Basil, 1641.—*Haller* Elem. Physiol. Vol. IV. p. 297.—*Monro* Prælect. medicæ, &c. p. 27. Lond. 1776.—*Boehmer* Observ. anat. rar. Fasc. II. Obs. 3.—*Sabourant* in Prix de Chirurg. XI. p. 96. Several cases are related by *Voigtel*, from *Wandeler*, *de Haen*, *Ford*, and *Ferro*, v. Pathol. Anat. Vol. I. p. 679.—*Flor. Caldani* Observat. anatom. Patav. 1803, with engravings.—*Powel* in Medic. Transact. Vol. V.—*Esquirol* in Dict. des Sc. médic. Vol. VIII. p. 291.—*Hay* in *Abercrombie*, p. 430.—*J. Ward.*—*Leveillé*, read at a sitting of the Acad. de Médec. of Paris, 10th Aug. 1824.—*Schneider* D. de magna quadam encephali destructione ejusque sequelis. 8vo. Berol. 1824.—*Rust's* Magazin f. d. ges. Heilk. Vol. V. Part. I. p. 165.—*Béclard.*—*de la Motte*, in Philadelphia Journal of the medical and physical Sciences, August, 1827.—*Magendie* in Journ. de Physiol. Jan. 1828, Vol. VIII. p. 27.—*D. Meyer* D. de cerebri tumoribus. 4to. Berol. 1829, with engravings. *A. A. G. Rhodius* D. s. Casum singularem de Amaurosi cranii osteosteatomate effecta. 4to. Berol. 1829, with plates. I once found in a man who had been affected with amaurosis of

the right eye, the optic nerve compressed by a scrofulous tumour just before its entrance into the orbit. v. my Selt. Beob. Part I. p. 108; in other cases it was compressed, together with the nerves following up to the eleventh pair, by a scirrhous tumour, v. Selt. Beob. Part II. p. 86, or by medullary sarcom of the appendage of the brain, p. 93. The third, fifth, and sixth nerves were, in one instance, compressed by a hard tumour. v. *Landmann* Comm. path. anat. exh. morbum cerebri oculique singularem. Lips. 1820. The fifth pair was found atrophic and compressed by tumours. v. *Fribault* and *Marechall* in Journ. génér. de Médec. Vol. XLIV. Aug. 1812, (in a person with face-ache, tic douloureux).—*Desmoulins* in *Magendie's* Journ. de physiol. Vol. V. No. 1 and 2, p. 21 (with loss of smelling although the olfactory nerve was healthy.)—*Hay* in *Abercrombie*, p. 432, case 20, (the seventh pair was compressed; the sight and hearing diminished.) Wasting of the fifth pair, with total destruction of the seventh and eighth, from a tumour, is described by *D. Meyer* D. de cerebri tumoribus. 4to. Berol. 1829, with engravings. In a man with double vision, paralysis of the right side, and distortion of the left eye towards the nose, the left nervus oculum abducens was pressed by a tumour. v. *Yelloly* in Med. chir. Trans. Vol. I. p. 181. The seventh pair was compressed at its entrance into the petrous bone by a tumour, in an old man. v. *J. H. Wishart* in Edin. med. and surg. Journ. By pus in the fallopian canal. v. *Bellingeri* in Annali universali di Medicina, March, 1827. In one instance a tumour of cartilaginous hardness was situated on the auditory nerve. v. *Sandifort* Obs. anat. path. Lib. I. Chap. IX. p. 117. tab. 8. fig. 5, 6, 7. The nervus vagus has been seen compressed and wasted several times. v. *Cappel* D. de epilepsia e tumore nervo vago inhærente. Helmst. 1781 (the cerebral end.) —*Biermayer* Museum anat. pathol. No. 186, (by an ossified pointed absorbent gland, situated behind the left lung, tetanus and death.) It and the frenic nerve, in a person who died with difficulty of breathing, surrounded by tuberculous glands, and wasted at the lower part, was observed by *Andral* Nouvelle Biblioth. méd. No. 7, 1826.—*Dupuy* v. Journ. gén. de Méd. p. 5, April, 1821, and Jan. 1825, imagines that the so-called crib-biting of horses arises from the pressure of the nervi vagi above the superior laryngeal nerve, and was confirmed in some cases. Sometimes we find the spinal nerves compressed by tumours; hence arises paralysis of the lower extremities from hydatid tumours in the spinal canal. v. *Chaussier* in the note to the fortieth letter of his edition of *Morgagni* De sed. et caus. morbor. Paris, 1822. In a woman with paralysis of one arm and of the feet, the anterior left roots of the nerves at the lower part of the neck were compressed and wasted by a tumour. v. *Valpeau* in *Magendie's* Journ. de Physiol. No. II. p. 138, 1826. A tumour in the canal of the spine compressed the anterior roots of the nerves, and produced imperfect paralysis and violent pain of the feet. v. *Monod* in Nouv. Biblioth. Méd. May, 1827. Several instances of compression of the vocal and frenic nerves, and also of the branches of the sympathetic, from tubercles, aneurysm, &c., are described by *Lobstein* De nervi sympathetici humani fabrica usu et morbis comment. § 145, 147, and 156. 4to. Paris, 1823. [In Mus. St. Thomas's Hospital a scrofulous tumour in the dorsal portion of the spinal marrow produced paralysis with loss of sensation in the lower extremities. T.]

(7) *Swan*, for instance, found in a man who had taken violent medicines, and at last was subject to canine hunger, that the œsophageal branches of the tenth pair were wasted and morbid; and in consumptive cases the trunks of the nervi vagi were frequently extremely thin. v. his Observations on some points relating to the anat. phys. and pathol. of the Nervous System, Chap. II.

(8) As the thickness of the nerves varies exceedingly in different individuals, the considerable size which appears to have been noticed, viz. in the often-cited cases of *Laumonier* in Journ. de Médec. Vol. XXXVI. p. 259, hardly belong here. It is an interesting circumstance, however, that the sympathetic nerves and the ganglia have been found unusually large, as for instance, by *Cayre* and *Pinel*. v. Nouv. Journ. de Médec. Vol. IV. p. 40-45, (in eight cases.)—*Romberg* found, in a girl who was an idiot from birth, the nerves in proportion to the brain very large and firm, but especially the ganglionic system of the belly, very large. v. Zeitschrift f. die Anthropologie, 1823, Part III. p. 224.—*Lobstein* De

nervi sympathetici humani fabr. usu et morb. Comment. p. 55, § 70, 4to. Paris, 1823, (in two cases.)—*A. Duncan*, Reports of the practice in the Clinical Wards, &c. London, 1819, also found them (three or four) too thick in a diabetic patient.—In a hemicephalic monster, *Meckel* found the sympathetic nerve double its usual size. v. Descrip. monstr. nonnull. 4to. Lips. 1826, p. 21; although I remembered these cases in dissecting idiots and hemicephalic monsters, I have never observed the size of the ganglionic system such as is stated, nor was it remarkable; it also appears that it is not constant.

(9) In a child who died of chronic water in the head, the fourth pair of nerves was unusually thick and white, and the optic nerves wasted. v. *Jeffray*, in Lond. Med. Repos. p. 278, April, 1822.—In neuralgia and imperfect paralysis, the nerves have been sometimes seen thickened, not merely in ischias nervosa Cotugnii, but also in others. v. *Petit* in Mém. de Chir. de l'Acad. royale, Vol. I. p. 90.—*Cirillo* Prakt. Bemerkungen üb. dier vener. Krankheiten. Leipz. 1790, p. 134.—*C. Wenzel* Ueber Induration, u. s. w. p. 50, Mainz, 1815.—*Swan*, chap. 4.—*Serres*, in *Magendie's* Journ. de Physiol. Vol. V. No. 3, p. 233, found in a man, the right side of whose face was paralytic, the ganglion of the fifth pair swollen, and the nerves otherwise diseased. In the foot of a man, which was affected with elephantiasis, the tibial nerve was uncommonly thickened, irregular, and its sheath especially swollen. v. *Chelius* in Heidelberger klin. Annalen. Vol. II. Part III. p. 359, pl. 2.—In a few cases of old chronic inflammation, thickening and partial suppuration of the leg, I have seen the ischiatic nerve remarkably thickened, and at the same time greyish yellow and semi-transparent; a very painful enlargement of the nervus tibialis posticus was seen by *Barkow* Ueber Nervenanschwellungen in Nov. Act. phys. med. Acad. Nat. Cur. XIV. and *A. Cooper's* Lectures, Vol. I. p. 44. — Thickening of the saphenous nerve in the neighbourhood of a varicose saphenous vein. v. *Gendrin* Histoire Anatomique des Inflammations, 2 vols. 8vo. Paris, 1826.—Several instances of partial thickening of the sympathetic nerve are mentioned by *Lobstein*.

§ 251.

We but rarely observe important variations as to the FORM, POSITION, and RAMIFICATION in the nerves. Thus, for instance, occasionally we miss one of the usual roots of the OLFACTORY NERVE; it has been found in new-born children, especially in those having watery heads, as in the young fœtus, too thick and hollow,[1] or, in a deaf and dumb person, merely its bulb twice as thick as in the normal state,[2] &c. More frequently do the origin and course of the OPTIC NERVES vary in cyclopic monsters;[3] in these,[4] and in hemicephalic cases,[5] the optic nerves have been noticed completely distinct and without a commissure, in an otherwise normally formed brain.[6] As an approximation to this state, they have been seen several times, in dropsy of the brain, as it were torn asunder, and instead of crossing, connected only by a transverse portion of nerve.[7] From the point of decussation, there arose in one instance a pointed medullary process projecting forwards,[8] &c. The FOUR FOLLOWING NERVES of both sides in cyclops run unnaturally close to each other. The THIRD NERVE sometimes varies in reference to its branching and its twigs to the optic ganglions, thus, for instance, it sends off the long root to it.[9] Among the varieties of the FIFTH PAIR, the not unfrequently early separation and dis-

tinct course of the frontal, infra orbitar, and maxillary branches, is important in practice. The OUTER OCULO-MUSCULAR NERVE sometimes gives off the nasal branch instead of the fifth pair.[10] The *nervus recurrens* of the auditory nerve, in abnormal position of the neighbouring arteries, sometimes also exhibits an unnatural course.[11] The SUBLINGUAL NERVE, in one instance, passed through the vertebral artery, which was cleft for it.[12] The SPINAL NERVES are sometimes subject to variation; this is especially the case in the extremities. In one monster, which wanted the sacrum and coccyx, the ISCHIATIC NERVE proceeded through a large aperture between the fifth lumbar vertebra and the iliac bone.[13] In deficient formation of the pericardium the course of the PHRENIC NERVE was found abnormal.[14] The SYMPATHETIC NERVE is also found varying in different ways, and not rarely curved with the spine, or thrust out of its course by tumours on the spine. In one instance, owing to the absence of the lingual branch of the fifth pair, and of the sublingual nerve, the sympathetic nerve gave off branches from the cervical ganglions to the tongue and its muscles.[15]

(1) I have seen this a few times; in a hemicephalic monster, No. 8016, the hemispheres were very pointed in front, and reached to the crybriform plate, extending almost to the olfactory tubercles, as in animals.

(2) *A. Meckel* in *J. F. Meckel's* Archiv für Anat. u. Physiol. 1828, No. II. p. 169.

(3) Compare § 249, note 10.

(4) *Ol. Borrich.* v. Acta med. Vol. I. Obs. 93, Havn. 1671.—*Littre* in Mém. de l'Acad. des Sc. de Paris, 1717, p. 285.—*Albrecht* Eph. Acad. Nat. Cur. 1744, Vol. VII. p. 363, Obs. 102.—*Eller* and *Roloff* in Hist. de l'Acad. des Sc. de Berlin, 1754, p. 112.—*Riviera* Storia di un Monoculo, etc. p. 12, 8vo. Bologna, 1793.—*Ulrich* and *Heymann* in *Meckel's* D. Archiv f. die Physiolog. Vol. VI. p. 522.—*Ullersperger* Pathol. anatom. Beschreibung zweier Missgeburten. 8vo. Würzb. 1822.—*Tiedemann* in Zeitschrift für Physiologie, Vol. I. Part I. p. 80, etc.

(5) *Prochaska* Annotat. acad. Fasc. III. p. 175.—*Klein* Spec. inaug. anat. hist. Monstror. quorundam descriptio, p. 16, Stuttgard, 1795.—In my Monstror. sex humanor. anat. et physiolog. disquisitio, p. 8, Francof. ad Viadr. 1811; and since then in two cases.—*Kelch* Beiträge zur pathol. Anatomie, p. 85. Berl. 1813. I have already, in another part of my Selt. Beob. Part I. p. 43, pointed out the causal connexion of water in the head with this anomaly.

(6) *Vesalius* De corp. hum. fabr. L. IV. c. 4.—*Fabricius ab Aquapendente* De Oculo. Part III. cap. 11.—*Valverde* Anat. del corpo umano. Lib. VII. c. 3.—*Caldani* Opuscula anat. p. 40. Patav. 1803.

(7) *Osthoff* Kleine Beiträge zur Erweiterung des med. Wissensch. p. 146. Duisb. 1804.—*Breschet* in Archives générales de Médecine, July, 1823; I have found this occasionally under similar circumstances, and saw one such case with Professor *Provençal*, at Montpellier.

(8) *Sömmerring* and *Nöthig*, fig. 4.

(9) *Morgagni* Epist. anat. XVI. § 59.—*Meckel* De quinto pare nervorum, § 48.

(10) v. my Selt. Beobach. Part I. p. 108.

(11) *Stedmann*, in Edinb. med. and surg. Journal, No. 77, Oct. 1823, saw in a man whose subclavian artery arose from the arch of the aorta, and passed to the right arm between the gullet and the spine, the right deficient, and the branches which supplied the place of the laryngeal arising from the middle of the neck above. A similar case was observed by *Harles*, *ib.* April, 1826. In a man whose

aorta turned first to the right side, the right nervus recurrens passed under the arch of that vessel, but the left on the ductus arteriosus Botalli, up to the larynx. v. *Sandifort* Mus. Anat. Vol. I. p. 273; Vol. II. pl. 107, fig. 1 and 2.

(12) I saw a wax model of this case in the Anatomical Museum of the Josephine Academy at Vienna.

(13) *Friedlieb* Monstrosi fœtus descriptio atque delineatio, p. 39. pl. 6. fig. 1. 4to. Altonæ, 1803.

(14) In the totally absent pericardium *Baillie* saw the left phrenic nerve passing down close behind the breast-bone. v. Transactions of a Society for the improvement of medical and chirurgical Knowledge, Vol. I. p. 91.—In two cases, v. my Selt. Beob. Part II. p. 44, and in No. 2874, my Verzeichn.; with deficiency of the left side of the pericardium, the left phrenic nerve was curved forwards and to the right; a similar case is given by *Breschet* in Répertoire gén. d'Anat. et de Physiologie pathol. 1826, Vol. I. Cah. I. p. 215, pl. 5.—In a child with prolapse of the heart and deficient pericardium, the phrenic nerves passed on the outer side of the great vessels. v. *Haan*, D. de ectopia cordis casu illustrata, p. 13. 4to. Bonnæ, 1825.

(15) *Lobstein*, § 66, p. 53.

§ 252.

The COLOUR OF THE NERVES is found irregular in various ways, and especially occurs in vicious structure. Thus atrophic or softened nerves usually lose their gloss and whiteness, become partly opake, grey, or yellowish, or rather greyish-yellow; contused or inflamed nerves appear more or less red throughout, or spotted and streaked with red; in ulcers and in mortified parts, the nerves are usually more or less discoloured; in great destruction, viz. in gangrene, in complete atrophy, in the cancerous-like state especially, we observe them at certain spots of different shades of brown and rust colour. In jaundice, they participate very little or not at all in the discoloration.[1]

(1) I have occasionally found in new-born children, which had perhaps died a short time before birth, the medullary part of the brain, spinal cord, and some of the great nerves, as the ischiatic, here and there of a light yellow colour; and *Lobstein*, p. 166, § 159, found one child in which the spinal marrow was of a citron yellow, and the sympathetic nerve of a similar colour, in spots; upon Kirrhonose, compare above, § 39, note 2.

§ 253.

Not less is the CONSISTENCE OF THE NERVES sometimes morbidly changed, that is, either decreased or increased; the former is the most frequent, and the nerve, instead of being firm and elastic, becomes SOFT, WITHERED, SHRIVELLED, EASILY TORN, and sometimes as if it had been MACERATED.[1] In some cases, the nervous sheaths exhibit a tolerably normal firmness, but the several nervous bundles are separated from each other, and as it were loosened. In other cases, however, the medullary part of the nerve especially is softened, as if it had been immersed in a solution of kali, so that the discoloured medullary substance has no fibres, but runs out from a divided nerve like a thin pulp, like jelly, or even like water. Sometimes at certain

spots the nerves are entirely deprived of medulla, and the hollow sheaths alone remain; such are not unfrequently seen within the cavity of the skull and spine, in children with cyclopy, hemicephaly, hydrencephalocele, internal water of the head, and *spina bifida.*[2] Further, a higher degree of inflammation seems, as in the brain and spinal marrow, and also in the nerves, capable of producing a softening and fluid state of their substance. The opposite vice, or INDURATION, occurs much more rarely in the nerves, and seems to be especially produced in chronic inflammation by the deposit of plastic matter in the cellular tissue, which glues together the separate nervous bundles. Atrophic nerves also appear to be too dry and hard; sometimes the nervous sheath only appears to be thickened and too hard. A true conversion of the nervous substance into cartilage and bone cannot take place.[3]

(1) Atrophic and paralysed nerves, especially the optic, have frequently this appearance; the lower extremity of a divided nerve is also withered; in dropsy the nerves are sometimes partially too soft. v. *Autenrieth*, D. observationes in hydrothoracem virorum, p. 20. Tüb. 1809.

(2) *Morgagni*, Epist. LII. 31, had already found the optic nerve of an atrophic eye so hollow, that when cut through he compared it to an artery. In hemicephalic monsters, I also remarked this very early, and pointed out the connexion of water in the head in reference to the nerves. v. Monstror. sex human. anatom. et physiol. disquisitio, p. 21, Francof. a. V. 1811; and since then have often found it confirmed. More recently I have seen in a cyclopic monster, No. 2885 of Bresl. Mus. one of the optic nerves large, with its sheath very firm, but when cut through, quite hollow and deficient in nervous matter.

(3) As by bony and stony concretions upon and in the nerves, &c.

§ 254.

VICES OF CONTINUITY are very common in the nerves, as, from their extensive distribution, they participate in every trifling injury; they are then sometimes cut through, torn asunder, or only imperfectly separated and contused, tied together, cut, pierced, &c. If the nerves be stretched gradually, they often yield remarkably, as in many swellings of joints, in exopthalmus, &c., without having their functions destroyed; but if they be suddenly and violently extended, as by many bony tumours, by aneurysm, &c., they are more injured, and can even be torn through without breach of continuity in the neighbouring parts.[1] If the larger nerves be wounded, there sometimes arise, besides the necessary palsying of the part with which they are connected, not merely active and continued neuralgia and sympathetic affections,[2] but also similar organic phenomena, as in other injured soft parts, viz. swelling, redness, effusion of coagulable lymph, and union. If a nerve be completely divided, both its extremities swell, but especially the upper,

the peripheric part of the nerve becomes thinner, even slightly discoloured, and the effused lymph unites both ends into a more or less large and solid knot, consisting of cellular tissue, in which, after sometime, some new irregular variously connected nervous threads are produced. In instances of more considerable loss of substance in a nerve, the ends are either not united, and cicatrize with a permament swelling, with loss of sensation and motion in the more distant portion; or if they be but slightly separated from each other, they may be united by a newly-produced, but, in that case, thin interposed substance. In amputated limbs we find the ends of the nerves at first, to a greater or less extent, swollen, inflamed, spotted or deep red from the blood effused in their sheaths, but subsequently subsiding into a greyish, thick, tolerably firm, and not more fibrous-like knot, from which delicate fibres spring for nerves; if the end of a nerve remain bare after amputation, it inflames violently, and is gradually covered with very sensible granulations. We not unfrequently observe in the scar, after amputation, several of the nerves adhering in a loop; for instance, the upper end of the *nervus vagus* united with the fifth cervical nerve.[3]

(1) *Flaubert*, Mémoire sur plusieurs cas de luxation, etc. in Répert. gén. d'Anat. et de Physiol. pathologiques, 1827, Vol. III. Part I. p. 102, mentions a case of tearing of the last four nerves of the brachial plexus from the spinal marrow, in consequence of violent extension in attempting to reduce a dislocation of the upper arm; the patient lived eighteen days.—*Lobstein*, p. 165, § 158, states that he has frequently seen the ganglionic nerves in the belly torn by large tumours.

(2) For instance, if a nerve be included in the ligature applied on artery—if a nerve be injured in bleeding.—*Wardrop* saw a case of severe neuralgia subsequent to puncture of the nerve of one of the fingers. v. Med. Chir. Trans. Vol. XII. p. 205. Similar symptoms occur from contusion of the popliteal nerve, and the application of quicksilver to it. v. *C. Bell*, Surgical Observations, &c. p. 440. London, 1816.—In another case, the symptoms were so severe after contusion of the radial nerve, that amputation was required. v. *Denmark* in London med. chir. Transact. 1813, Vol. IV. p. 48.

(3) v. *Flourens* in Annales des Scienc. naturelles. Vol. XIII. Févr. 1825, p. 113. On the union and reproduction of nerves, v. *Fontana*, Traité sur le Venin de la Vipere, Vol. II. p. 177. Florence, 1781. — *Michaelis*, Ueber die Regeneration der Nerven, a letter to *Pet. Camper*. Kassel, 1795. — *Arnemann*, Ueber die Reproduction der Nerven, Göttingen, 1786, and Versuche über die Regeneration in lebenden Thieren. Vol. I. Göttingen, 1787, with pl.—*Alex. Monro*, Observations on the structure and functions of the nervous system, p. 81, 83. —*Cruikshank*, Experiments on the nerves, particularly on their Reproduction, in Phil. Transact. 1795, Vol. I. p. 177, (he seems to have been the first who instituted accurate experiments with *Hunter*.)—*Baronio* in Memorie di Matematica e Fisica della Soc. Ital. Vol. IV. p. 480. Verona, 1788. — *Haighton* in Phil. Transact. 1795. Part I. p. 190. — *Mayer* in *Reil's* Archiv f. d. Physiol. Vol. II. p. 449.—*van Horne* De iis, quæ in partibus membri præsertim osseis amputatione vulneratis notanda sunt, p. 33. L. B. 1803.—*Swan* and *Descot*.—*Breschet* in Dict. des Sc. médicales. Vol. V. Art. Cicatrice.—*Larrey* in Revue médicale franç. et étrang. March, 1824, (also compressed,) and in Annales des Sc. naturelles, April, 1827, Vol. X. p. 439. — *Prevost* in Mémoires de la Soc. de Physique et d'Histoire naturelle de Geneve, 1826, Vol. I.—*Ekström*

and *Retzius* in Ars-Berättelse om Svenska-Läkare-Sällskapets Arbeten, p. 20, Stockh. 1827, experiments on the division and reproduction of the nervus plantaris in horses. [*G. Langstaff*, Practical Observations on the healthy and morbid conditions of stumps, in Med. Chir. Trans. Vol. XVI. p. 128. T.]

§ 255.

It does not appear remarkable that there should be, from the great rarity of their organic diseases and from the delicacy of their structure, great obscurity as to the VICES OF TEXTURE IN THE NERVES. INFLAMMATION OF NERVES, *neuritis*,[1] occurs not merely in consequence of injuries or exposure, but also spontaneously and from internal causes, and is known by swelling, injection, and more or less extensive redness, with which there is also usually softening or loosening, as well also as hardening and thickening of the tissue, sometimes even adhesion to the neighbouring parts; so that very many of the above described vices of colour and consistence in the nerves appear to be produced, in the greater number of instances, by preceding acute or chronic inflammation. We must, however, distinguish the accidental colouring of a nerve which arises from congestion of blood in a part, or from effused blood in the neighbourhood, from true inflammation.[2] SUPPURATION and MORTIFICATION do not appear to arise primarily in the nerves; still, however, they are not unfrequently in part ultimately destroyed by these diseases, although they often resist them for a pretty long while.[3] Various spurious formations frequently occur in the nerves, to which we usually apply the general name, NERVOUS SWELLINGS, *tumores nervorum*, *neuromata*,[4] from their external appearance, as it is difficult to determine their texture. These vary exceedingly in number, size, position, and texture; usually there is found but one, though sometimes also several, and even very many in the same individual;[5] their size varies from that of a corn of hemp or wheat, to that of a walnut, an egg, and in some cases of a small melon;[6] most commonly they produce, during life, little and very painful knots in and upon the membrane of the nerve;[7] there have been however found nervous knots on many of the cerebral, spinal, and even on the ganglionic nerves.[8] Finally, as to the structure of these nervous tumours, they are usually fatty, encysted, or fibro-cartilaginous, which are situated in the cellular tissue of the nerves, and tear asunder and separate from each other several nervous bundles, which are otherwise healthy: in other instances, there are tubercular or other masses of coagulated albumen attached at a particular part of the diseased nervous sheath; in still other cases the medulla of the nerve appears to be diseased; this especially occurs in sarcomatous and cancerous swellings of the

nerves, in which the whole nerve is here and there swollen, hardened, knotty, discoloured, and degenerated in a greater or less degree throughout both its sheath and medulla.[9]

(1) *De Plouquet* D. de myositide et neuritide. 4to. Tübing. 1790.—*Nasse* D. de neuritide. 4to. Halæ, 1801.—*Home* in Trans. of a Soc. for the improvement of med. and surg. Knowledge, Vol. II. No. 11. — *Bettoli* in Giorn. della Soc. med. chir. di Parma, Vol. II. p. 256.—*Martinet* Mémoire sur l'inflammation des Nerfs. Paris, 1824; and in Revue Médic. franç. et étrang. 1824, Vol. II. p. 329—354.—*Dugés* Sur la neurite puerperale, etc. *ib.* Vol. III. p. 157—179.—*Gendrin* Histoire anatom. des Inflammations.—On the inflammation of nerves in hydrophobia, in the vicinity of the bitten part, *Autenrieth* D. de hactenus prætervisa nervorum lustratione in sectionibus hydrophoborum, Tübingen, 1802, has especially treated.—*Brandreth*, in Edinb. med. and surg. Journ. April, 1825, No. 83, saw in a case of hydrophobia, considerable inflammation throughout a large portion of the nerve.—*Hertwig* found only in two out of many mad dogs, the nervi vagi and sympathetici reddened at certain spots. v. *Hufeland's* Journ. 1828, Supplement, p. 55.—*Reil* Ueber Erkenntniss und Cur. der Fieber, Vol. IV. p. 56, found, in a case of typhus, several of the nerves inflamed, and improperly considered this accidental complication as the cause of the disease, whilst it was, at the utmost, its consequence. — *Weinhold* also found inflammation of the nerves in nervous fever. v. Kritische Blicke auf das Wesen des Nervenfiebers und seiner Behandlung. Dresd. 1814.—It is not surprising that acute neuralgiæ, viz. tic douloureux, prosopalgia, ischias nervosa, &c. should be considered as arising from inflammation of the medullary part and sheaths of the nerves; this may indeed occur in some cases, but by no means in all.—Some interesting cases, besides those already mentioned, are described in *Swan* and *Descot.* — *Serres* in *Magendie's* Journ. de Physiologie, 1825, Vol. V. No. 3, p. 233, (the ganglion gasseri, and the larger parts of the fifth pair of nerves.)—*Ahlberg* and *Retzius* in Ars-Berättelse om Svenska Läkare-Sälskapets Arbeten, lemnad af *Ekström*, 1826, (the ganglia of the lumbar nerves.) —*Pelletier* in Revue médicale franç. et étrangère, Nov. 1827, (the ulnar and median nerves in tetanus, after compound fracture of the arm.)—*Lobstein* has seen the sympathetic nerves inflamed several times.

(2) Practical anatomists will readily grant how difficult it is to decide, whether the nervous sheaths and the nervous matter are only apparently or actually inflamed on account of irritation, congestion, extravasation of blood, &c. I have only seen actual inflammation of nerve up to this time, in consequence of accidental or intentional injury.—*Morgagni* once saw, in the axis of the ischiatic nerve, a long vessel filled with blood, almost a line thick. v. Epist. LXX. 10.

(3) *Morgagni*, Epist. L. 11 and 55, found, in a popliteal aneurysm, the nerve here situated almost completely destroyed, which I also have noticed in a similar case. In a large tumour running into suppuration in the region of the parotid gland, one part of the facial nerve was completely destroyed. v. *Billard* in Archives de Médec. Vol. VI. p. 347.

(4) *Spangenberg* Ueber Nervenanschwellungen in *Horn's* Archiv f. med. Erfahrung. Vol. V. p. 306. — *Alexander* D. de tumoribus nervorum. 4to. Lugd. Bat. 1810.—*J. L. Aronssohn* D. Observations sur les tumeurs developpées dans les nerfs. 4to. Strasb. 1822.—*Barkow* Bemerkungen über die Nervenanschwellungen in Nov. Act. phys. med. Acad. Nat. Cur. Vol. XIV. Part II. p. 515, pl. 32, with engravings.—Some cases, besides those already quoted in *Swan* and *Descot.* Further *Valsalva*, v. *Morgagni*, Epist. L. 15. — *Cheselden* Anatomy of the human Body, p. 256, pl. 28, 1741. — *Petit* in Mémoires de l'Academ. de Chir. Vol. I. p. 90. — *Pet. Camper* in Demonstrat. anat. pathol. L. I. Cap. 2. § 5. — *van Gesscher* Ueber natur u. Heilart der verschiedenen Arten von Geschwülsten. p. 65. Leipz. 1787.—*Ev. Home* in Transact. of a Soc. for the improvement of med. and surg. Knowledge, Vol. II. No. 11, p. 152.—*Bisset* in Mem. of the medic. Soc. of London, Vol. III. p. 58.—Encyclopedie méthodique de la Chirurgie, Vol. II. p. 442. — *Bichat* Allgemeine Anatomie übers. v. *Pfaff*, Thl. I. Part I. p. 303.—*Marandel* in Bulletin de la Soc. de Médec. App. zum Journ. de Médec. continué,

Vol. XI. — *Neumann* in *von Siebold's* Samml. chir. Beobachtungen, Vol. I. p. 54.—*Mojon* and *Covercelli, ib.* Vol. I. Part III.—*Adelmann, ib.* Vol. III. p. 177. —*Weinhold* Ideen über die abnormen Metamorphosen der Highmorshöhle. Leipz. 1810.—*Odier* in Manuel de Médecine pratique, p. 278 and 362. Paris and Geneva, 1811. — *Gooch,* Cases and practical Remarks in Surgery, Vol. II. — *Ch. Bell,* Operative Surgery, Vol. II. p. 161.—*Zagorsky* in Mémoires de Petersburg, Vol. III. p. 219. — *Rudolphi,* v. *Oppert.* — *Sédillot* in Journ. général de Médecine. Août, 1814, p. 380.—*Schiffner* in Den Oestreich. medic. Jahrbüchern, Vol. IV. Part IV. p. 77—90; and Vol. VI. Part IV. p. 44—54, with engravings, (very many on several of the cerebral, spinal, and ganglionic nerves of two brothers, who were cretins.)—*Heineke* D. de mastodynia nervosa. 8vo. Berol. 1821, with engravings.—*Berndt* in *Rust's* Magazin f. d. ges. Heilk. Vol. XIII. Part I. p. 159. — *Wernery* in *Hufeland's* Journ. der prakt. Heilk. May, 1823, p. 107. — *Lobstein* de Nervi sympathetici hum. fabr. et morbis. § 157. — *Ollivier* Ueber das Rückenmark, u. s. w. d. v. *Radius,* p. 2. 12mo. Leipz. 1824. Beobachtung 27.— *Hesselbach* Beschreibung der pathol. Präparate zu Würzburg, 1824, p. 361, No. 274, p. 362, No. 596, 641. — *Ehrmann* Compte rendu sur les travaux anatomiques, p. 36. Strasb. 1827. — *G. Sandifort* Museum anatomicum, Vol. III. p. 148, No. 41. — *Cruveilhier* Anatomie pathologique, Livraison, I. Paris, 1828, pl. 3. — *Pring,* v. *Abercrombie.*—I have, up to the present time, found three nervous knots, and all of them small, one as large as a date seed on the median nerve, another as big as a pea, and a third of the size of a vetch seed on a cutaneous nerve. v. Verzeich., No. 2317, 2318, and 8853.

(5) To wit, in the cases of *Schiffner, Cruveilhier, Barkow. Richerand* found a nerve, forming a whole row of spindle-like swellings. v. *Descot,* p. 118.

(6) This was found by *Dubois* in the median nerve. v. *Spangenberg.* As large as a hen's egg and thereabouts, described by *Alexander, Home, Aronssohn, Heineke, Ehrmann,* and *Sandifort.*

(7) *Wood,* On painful subcutaneous Tubercle, in Edinb. med. and surg. Journ. Vol. VIII. p. 283 and 429, and *Jaumes* D. sur une espèce de tumeur squirrheuse enkystée, attribuée mal-à-propos à une affection des nerfs. Paris, 1828. Both writers consider that they were not nervous tumours, but fibro-cellular or cartilaginous tumours, which, surrounded by hardened and thickened cellular tissue, indented themselves into the nerves; but I doubt this very much, as in the instances before me, the knots are distinctly situated in the nerves themselves, and not in the tissue of their coat; the extreme pain which they give rise to also opposes this view, as numerous other and large swellings press upon the cutaneous nerves, and stretch them, without giving rise to similar symptoms. Observations on this kind of knot are given by *Cheselden, Camper, Bisset, Siebold, Neumann, Swan, Descot;* similar cases are related by *Portal* Cours d'Anat. médicale, Vol. IV. p. 247.—*Pearson,* in Medical Facts and Observations, Vol. VI. p. 95.—*J. Thomson,* in Edinb. med. and surg. Journal, Vol. VIII. p. 289.—*Newbigging,* p. 289.—*Gillespie, ib.* — *Marshall Hall, ib.* Vol. XI. p. 466. —*Windsor, ib.* Vol. XVII. p. 261.—*Nicod* Nouv. Journ. de Médecine, Nov. 1818.—Cases of *Marjolin, Chaussier,* and *Fabricio,* mentioned by *Descot,* p. 106.—*Jacopi* Prospetto della Scuola di Chirurgia pratica, Vol. I. cap. 9, Milano, 1813. — *Monteggia* Instituz. chir. Vol. II. cap. 14, p. 197. Milano, 1813, &c.

(8) For instance, in the optic nerve of a blind person, a small hard knot, rather larger than a hemp-seed. v. *Sédillot* Journ. de Médecine, Vol. L. Aug. 1814, p. 380.—In the fifth nerve, *Dupuytren,* v. *Descot,* p. 20; *Leveque Lassource.* v. Dict. des Scienc. médic. Art. Cancer.—*Weinhold.*—*Schiffner.*—On the facial nerve, *Schiffner,* and *Wishart* in Edinb. med. and surg. Journ. July, 1822. On the auditory nerve, *Schiffner.* — On the pneumogastric nerve, *Schiffner* and *Barkow.* — On the recurrent nerve of *Willis, Schiffner.* — On the brachial nerve, *Cheselden, Petit, Home, Gooch, Delaroche,* and *Petit Radel,* v. Diction. de Chir. de l'Encyclop. méthod. Art. Tumeur, *Dubois,* v. *Spangenberg, Alexander, Odier, Aronssohn, Heineke, Hesselbach, Sandifort, Pring,* and myself. — On the dorsal and lumbar nerves, *Ollivier* and *Schiffner.* — On the nerves of the lower extremities, *Valsalva, Schiffner, Spangenberg, Bell, Ehrmann, Berndt, Hesselbach, Wernery.* — On the abdominal nerves, *de Haen,* v. *Lieutaud* Hist. Anat. med. L. II.

Sect. 6, Part II. p. 251, Obs. 787; and *Descot*, p. 120 and 121.—On the sympathetic nerve and its ganglions, v. *Bichat, Lobstein, Hesselbach* and *Cruveilhier.*

(9) This occurs in all the nerves, but most frequently in the optic, which I have noticed several times. I have, however, once seen it on the ischiatic nerve, at its origin, and in the suprascapular nerve, which was affected and degenerated into knots, by an osteosarcom situated in the upper arm; regarding the latter, v. my Selt. Beob. Part I. p. 83, pl. 2. I can, after what has been stated above concerning medullary sarcom, perhaps here notice how incorrect the opinion is, which considers this as a degeneration of the nervous medulla.

§ 256.

Lastly, we also occasionally observe irregularities in the nerves as to their CONTENTS. Thus the CELLULAR TISSUE, which forms the nervous sheaths and connects the several fibrils of a nerve, is here, as elsewhere, affected with INFILTRATION OF WATER, LYMPH, BLOOD, &c.; this is most commonly and distinctly the case in the larger nerves, viz. in the ischiatic, which has been found not unfrequently dropsical after active neuralgia, probably depending on chronic inflammation.[1] STONY AND BONY CONCRETIONS[2] have also been observed in rare cases on the nervous sheaths and in the cellular tissue of nerves, but are extraneous to the nervous matter. In a few instances, there has been observed a peculiar irritation in the nerves, from EXTRANEOUS bodies which have accidentally entered them and remained there for a long period.[3]

(1) *Dom. Cotunni* De ischiade nervosa commentarius, Neapol. 1764, reviewed in *Sandifort's* Thesaurus, Vol. II. No. 19, p. 403—451. Wien, 1770. Neapol. 1780. Leipzig, 1793. Further, the other works on this disease, on Prosopalgia and Neuralgia in general.

(2) For instance, on the optic nerve, *Blegny* Zodiac. Gall. Ann. I. April, Obs. 14, p. 81.— *Cheneau* Obs. med. Lib. I. cap. 1, Obs. 2, Lyons, 1673.— *Schurig* Lithologia, p. 100, 250.— *Walter* Observ. anat. p. 42, on the suprascapular nerve.—*Rudolphi* v. *Oppert.* On a tumour of the first dorsal nerve, v. *Ollivier* Traité de la Möelle Epinière, &c. case 27. On the phrenic nerve, *Camper* in *Snip* De lithotomia. 4to. Amstel. 1761.

(3) A piece of a ball in the radial nerve. v. *A. Denmark*, in Med. chir. Trans. Vol. IV. p. 48, for which the arm was amputated. A piece of porcelain remaining in the cheek fourteen years produced tic doloureux, which subsided on the removal of the extraneous body. v. *Jeffreys*, in London med. and phys. Journal.

END OF VOL. I.

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